

The AWA Journal

Quarterly Bulletin of the Antique Wireless Association, Inc.®

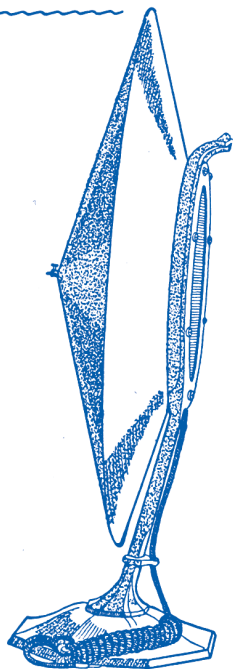
April 2005, Vol. 46 / #2

A *Western Electric* Achievement

The new 540A-W
Hornless Loudspeaker

\$35.00

This supreme loudspeaker gives the radio public what they have been waiting for for the last three years—a new type of speaker that does away with tinny horns and units. The 18-inch non-metallic cone reproduces programs so far superior to any other type of speaker that it cannot be compared with them.



Have your dealer demonstrate one in your home and you will realize why the 540 AW Western Electric speaker is taking the country by storm.

AWA CONFERENCE: AUGUST 23-27, 2005
OUR THEME: WESTERN ELECTRIC



Published for the radio collector, historian, restorer
and all vintage communications enthusiasts.

From a 1924 ad reprinted in Alan Douglas' Radio Manufacturers of the 1920s.

Originally published as

THE OLD TIMER'S BULLETIN

OFFICIAL JOURNAL, ANTIQUE WIRELESS ASSOCIATION, INC.™

BRUCE L. KELLEY 1914-1997, FOUNDING EDITOR

Antique Wireless Association is a trademark of the Antique Wireless Association Inc.

OFFICERS

President.....Geoffrey Bourne
1st V.P......Brian C. Belanger
2nd V.P......Ron Frisbie
**Secretary*....Pat Muehlbauer
Secretary Emeritus.....Joyce Peckham
Treasurer.....Christian R. Fandt

DIRECTORS

Lawrence F. Babcock
 Brian C. Belanger
 Geoffrey Bourne
 Gary Carter, W4IAM
 Hugh J. Davey
 Marc Ellis, N9EWJ
 Christian R. Fandt
 William Fizette, W2DGB
 Ronald Frisbie*
 Edward Gable, K2MP*
 Randolph W. Haus, KB2PLW
 Pat Muehlauer
 Richard Neidich
 Lauren A. Peckham*
 Allan Pellnat, KX2H*
 Thomas Peterson, Jr.*
 Bruce D. Roloson
 Robert Schaumleffel, WA2IKS

*Also serves on AWA Electronic
 Communication Board of Trustees

CONFERENCE COMMITTEE

Chairman.....Hugh J. Davey
Programs.....Lauren Peckham
Auctions.....Walt Buffinton &
 Bruce Roloson
Equipment Contest.....Geoffrey Bourne
 Chris Bacon
Photos.....Richard Ransley

HONORARY MEMBERS

Anthony Constable
 Bro. Patrick Dowd, F.S.C., W2GK
 Randolph W. Haus, KB2PLW
 Lauren Peckham
 Don & Joyce Ray
 Bruce Roloson
 Elliot Sivowitch
 Sherwood M. Snyder
 William B. Fizette, W2DGB

REGIONAL MEETING REPS

California.....Floyd Paul, W6THU
Canada.....To Be Announced
D.C. Area.....Paul Mooney, K4KRE
Indiana.....Herman Gross
New York.....Ed Gable
Carolinas Chapter..Ron Lawrence, KC4YOY
Texas.....Chevie Crandell (Dallas)
 David Moore (Houston)



WEBSITE: <http://www.antiquewireless.org>

Antique Wireless Association, Inc. is an IRS 501(c)3 charitable organization.

ISSN 1546-0622

AWARDS ADMINISTRATORS

AWA Houck Awards.....Barney Wooters
 Bruce Kelley-OTB Award.....Bob Thomas, W3NE
 Equipment Awards.....Geoffrey Bourne
 J. Albert Moore Award.....Thomas Peterson, Jr.
 Taylor Award.....Pete Yanczer
 Tyne Award.....Lauren Peckham

WHOM TO CONTACT

Please write legibly. Enclosing an SASE speeds replies.

DUES AND ADDRESS CHANGES: Pat Muehlbauer (Secretary), P.O. Box 108, Stafford, NY 14143; (585) 343-6436; e-mail antiquewireless@yahoo.com. Dues: \$20 per year in U.S.; \$25 elsewhere. Life membership: \$400 in U.S.; \$500 elsewhere. Make checks payable to "AWA."

AWA OFFICIAL BUSINESS: Geoffrey Bourne (President), 405 8th Ave., St. Albans, WV 25177-2853, (304) 722-4690, gcbourne@citynet.net.

BUSINESS CARD ADS: Edward M. Gable, 187 Lighthouse Rd., Hilton, NY 14468.

OTB SUBMISSIONS: Marc Ellis, Editor, OTB, P.O. Box 1306, Evanston, IL 60204-1306, (847) 869-5016, e-mail: mfellis@alum.mit.edu.

AWA REVIEW SUBMISSIONS: Brian C. Belanger, Editor, AWA Review, 5730 Avery Park Dr., Rockville, MD 20855-1738; e-mail bcbelanger@aol.com.

ORDERS FOR THE AWA REVIEW OR BACK ISSUES OF THE OTB; COORDINATION OF SLIDE SHOWS: Edward M. Gable, 187 Lighthouse Rd., Hilton, NY 14468, (585) 392-3088.

WANT ADS: Richard Ransley, P.O. Box 41, Sodas, NY 14551, (315) 483-9307.

ANNUAL CONFERENCE BUSINESS: Hugh J. Davey, 32 Paula Dr., Long Valley, NJ 07853; (908) 850-9086; beagle2@sprynet.com.

FINANCIAL REPORTS: Christian R. Fandt, 31 Houston Ave., Jamestown, NY 14701-2627; (716) 488-1722

A.W.A. ELECTRONIC COMMUNICATION MUSEUM: Please see "Museum News" column for contact and administration information.

OTB STAFF

Editor

Marc F. Ellis, N9EWJ

Design & Production
 Claudia Gray Sweet

Copy Editor

Joseph J. Schroeder, Jr., W9JUV

Web Page Designer

Chuck Schwark

Advertising Mgr.

Robert W. Perry

CONTRIBUTING EDITORS

Amateur Radio

John Rollins, W1FPZ

Below 535

Frank Lotito, K3DZ

Book Reviews

David W. Krauter

Breadboarding

Dick Parks

Classified Ads

Richard Ransley

The Communications Receiver

William B. Fizette, W2DGB

Equipment Restoration

D.K. Owens

Key & Telegraph

John Casale, W2NI

Mikes and Men

George A. Freeman

The Museum

Ed Gable, K2MP

Obituaries

Charles Griffen, W1GYR

On the Internet

Chuck Schwark

Radio Reproducers

David Crocker

Television

Richard Brewster

The Vacuum Tube

Ludwell A. Sibley

**ANTIQUE WIRELESS ASSOCIATION, INC.
 BOX E, BREEPSPORT, NEW YORK 14816**

The AWA Journal is published approximately four times a year by and for members of the Antique Wireless Association, Inc. AWA is a nonprofit historical society founded in 1952 and incorporated in the State of New York. The AWA Journal is available through AWA membership. Its issuance is subject to change from time to time as to frequency, content, and size. It is not liable in any way for any buying-and-selling transaction entered into as a result of its content.

© 2005 Antique Wireless Association, Inc.

© 2005 Antique Radio Club of America

CONTENTS

CONFERENCE PREVIEW

- 18 Rochester Conference 2005 Staff

FEATURE ARTICLES

- 32 The Beginnings of Radio Central Ralph Williams with Marshall Etter,
Ever wonder exactly how RCA got started?—An Antique Bob McGraw and Chris Bacon
Radio Gazette reprint.
- 34 A Simple "MOPA" Adapter for the 1929 QSO Party Bob Raide, W2ZM
Take advantage of the new event rules and put your Hartley on "40."
- 37 Re-Creating Reginald Fessenden's Liquid Barretter—
Part 1. Building a Replica Robert Murray
A seminal invention is duplicated from scanty historical records.
- 45 Vladimir K. Zworykin's Contributions to the RCA Electronic
Television System—Part 2. The Iconoscope James P. Rybak, W0KSD
An engineering genius creates a non-mechanical television camera.
- 58 Remembering Joyce Peckham Bruce Roloson,
Bidding a sad goodbye to AWA's long-time Secretary. Dick Ransley and Nancy Ransley

COLUMNS

- 7 AWA News Staff
- 14 Museum News Ed Gable, K2MP/W2AN
- 22 Breadboarding Richard A. Parks
Building a Replica Magnetic Detector by M. Daniel Merz
- 25 Radio Reproducers Dave Crocker
The Clapp-Eastham Electro-Ampliphone
- 26 Recent Radio, TV and Entertainment Obituaries Charles S. Griffen, W1GYR
- 29 Below 535 Frank J. Lotito, K3DZ
Let the Heavens Speak—an Introduction to Natural Radio. Part 2: Receiving Natural Radio Signals
- 40 Amateur Radio John Rollins, W1FPZ
Results of the Bruce Kelley 1929 QSO Party and the AWA AM QSO Party
- 44 On the Internet Chuck Schwark
Microphones on the Web
- 51 Key and Telegraph John Casale, W2NI
Centennial of the Martin Vibroplex
- 56 New Books and Literature David W. Kraeuter
- 59 The Vacuum Tube Ludwell A. Sibley
The Pencil-Tube Line
- 61 Television Richard Brewster
Fifty-One Years of Color Television
- 63 The Communications Receiver Bill Fizette, W2DGB
A Mystery Airport Receiver

DEPARTMENTS

- | | | |
|-------------------------|----------------------|----------------------------|
| 4 President's Message | 54 About Our Authors | 68 Business Card Ads |
| 4 Letters to the Editor | 55 Silent Keys | 70 Museum Store |
| 5 From the Editor | 65 Classifieds | 72 Museum Store Order Form |

THE PRESIDENT'S MESSAGE

If you didn't read about the passing of Joyce Peckham in the last issue of the *AWA Journal*, you'll see the special memoriam article in this issue. Joyce was our long-time Secretary, board member and all around AWA supporter. She was always willing to lend a hand and give sound advice. This is a great loss to the AWA. Our sympathies and condolences go out to Lauren and the Peckham family.



As of the November board meeting Joyce stepped down as secretary of the AWA. At this meeting the board appointed Patty Muehlbauer, our Recording secretary, to replace Joyce. She accepted willingly and has been doing a great job. Thank you Patty!

The planning for the 2005 Conference is well under way. The theme for this year is The Western Electric Company. Many of the seminars are already planned and the contest is ready to go. Look for more info in this issue and coming issues of the *Journal*.

I would like to thank our editor, Marc Ellis, and his designer Claudia Sweet for the wonderful job of redesigning the cover of the *AWA Journal*, formerly the *OTB*. I am sure many of you were shocked that we would change the name of our publication. But it was done at the request of many of you who felt this was necessary to keep up with the times and try to attract more and younger members. Thanks to all for your input.

I look forward to seeing many of you at one of the several radio meets that I attend throughout the year.

If you see me stop by and say hello. I always enjoy talking and listening to our members.

Well, enough for now. But I am always eager to here from *you*. If you have any questions or comments feel free to contact me, but please no calls after 9:30 p.m. (eastern time), if possible.

Geoffrey Bourne
405 8th Avenue, St. Albans, WV 25177
304-722-4690
gcbourne@charter.net

LETTERS TO THE EDITOR

All letters to the Editor are read with interest and attention, though not all can be published in this column. Letters may be paraphrased, shortened or otherwise edited to fit the available space. The statements made by our correspondents are their own opinions and do not necessarily reflect the views of either the AWA Journal staff or the Antique Wireless Association.

RCA SPRING QSO PARTY

The Radio Club of America will hold its first Spring QSO Party on May 7, 2005. This is not a CW or a vintage event; most participants will operate ssb. Intended to be a gathering of amateurs interested in the promotion and preservation of radio communications, the party is open to all. You need not be an RCA member to join in on the fun. Here are the times and frequencies of operation:

Time and Band(s)

1:00-3:59 PM EDT 20/15/10 meter bands
4:00-6:59 PM EDT 40/20 meter bands
7:00-8:59 PM EDT 75/40 meter bands
9:00-11:59 PM EDT 75 meter band

Frequencies

10 meters: 28350-28375 KHz

15 meters: 21290-21315 KHz
20 meters: 14215-14250 KHz
40 meters: 7215-7240 KHz
75 meters: 3840-3875 KHz

During the multiple band windows, QSY at will depending on conditions. Participants call "CQ RCA" and work as many stations as you wish. RCA member stations sign their call followed by "RCA." Those who work the RCA station, W2RCA, will receive a QSL card.

Logs should state each station worked, indicating whether the station was a member or non-member station, and frequencies used. A printable log sheet will be available on the RCA web site, www.radio-club-of-america.org, some time in advance of the event. Non-members are invited to browse the site to read about the history and mission of this century-old club.

Send your logs to Mike Raide, W2ZE, either

FROM THE EDITOR

Why Are We Slighting Broadcast Receivers?

A couple of weeks ago I was pleasantly surprised by a transatlantic call from long-time AWA member and friend Alan Carter of the UK. The call did have its somber aspect, because Alan wanted to give me some information for the Journal about the passing of Muriel Lock (see "Letters" and "Silent Keys"). But then we began to chat, comparing the lavishly-produced *Bulletin of the British Vintage Wireless Society* with our own *AWA Journal*. Apart from the obvious production differences, Alan was interested in the fact that the content of the BVWS book was definitely slanted towards home receivers and broadcasting while our own publication leans more towards commercial and amateur radio communications technology.

In past years, our publication did include much more home receiver content, but that has been dwindling with time. And it isn't a matter of editorial policy. I print almost every well-crafted article I receive on any aspect of vintage radio or wireless. So either our members aren't doing much with broadcast sets anymore or they feel

that articles about them wouldn't be welcome.

About the only broadcast set material we receive are the contributions to Ken Owens' "Equipment Restoration" column. And every once in a while, this issue included, Ken has no column because he hasn't had enough contributions.

So how about it, broadcast set enthusiasts? I know you're out there! Send me an article about your latest project or send Ken your tips and questions about solving repair problems. After one brave soul puts his toe in the water, others will surely follow.

Kudos For Our Copy Editor

In the last *Journal*, we honored the dedicated column editors who bring fresh and fascinating ideas to our publication for issue after issue. But one important person wasn't mentioned—not because we wanted to slight him but because he didn't happen to fit into that category.

Back in 1997 I advertised in *The AWA Journal* for a Chicago-area AWA member to assist me with publication. Joe Schroeder, Jr., W9JUV, was one of those gracious enough to
(continued on page 13)

by e-mail to mrmaide@cbs.com or by USPS mail to 21 Canandaigua St., Shortsville, NY 14548. SWL participants are also encouraged to send in logs.

The RCA QSO parties are created by Bob Raide, W2ZM, RCA's Amateur Events Chair. He looks forward to the support of the amateur radio community and would be pleased to receive comments or suggestions. Contact him on the air, at rlraide@adelphia.net, or at 2514 E. Sherman Hollow Rd., Penn Yan, NY 14527.

—From an RCA press release

CREDIT WHERE CREDIT IS DUE

Upon reading James Rybak's October 2004 *Journal* article on the contributions of Vladimir Zworykin to modern television, I was surprised that there was no mention of television's inventor, Philo Farnsworth. Despite a decades-long effort by RCA to re-write the history of television, it is well-documented that in 1935 the patent office reaffirmed that Farnsworth was the sole inventor of electronic television. His challenger, Zworykin, was unable to produce any note-

books, tubes, or eye-witness testimonies substantiating his claims.

Indeed, Zworykin himself, upon visiting Farnsworth's lab in 1930, was heard by many witnesses to remark "I wish that I might have invented it." RCA dogged Farnsworth for years in the courts, finally surrendering in 1939, when the company that "collects patent royalties, not pays them" purchased a Farnsworth license.

As a farm boy of 14, Philo would often spend evenings in the attic-turned-laboratory of his small house. There he would spend countless hours devouring magazines and working on his dream, high-resolution television.

On September 7, 1927, at the age of 21, Philo Farnsworth finally demonstrated modern electronic television at his laboratory in San Francisco. I hope to see a future AWA article about the boy who invented television.

GARY GORDON
Saratoga, California

Author's Response: I appreciate that Gary Gordon has taken the time to comment on Part I of my article entitled "Vladimir K. Zworykin's

Contributions to the RCA Electronic Television System." I share his respect and regard for Philo Farnsworth's work in developing an electronic television system.

With regard to my article, I would like to emphasize the following points:

1. The title of my article clearly states that its focus is on Zworykin's contributions to RCA's all-electronic television system. It was not intended to be a comprehensive review of development of all-electronic television. That would be appropriate subject matter for a book, not a short article.

2. I have not referred to Zworykin as either the "father" or sole "inventor" of electronic television. Not only that, but the history of technology shows us that it is not unusual for several individuals, acting independently and almost concurrently, to have developed similar or even almost identical ideas.

3. From my perspective, Farnsworth's most noteworthy contribution to electronic television was his "Image Dissector" television camera, not his receiver. Part I of my article dealt only with Zworykin's Kinescope receiver. I have compared (albeit somewhat briefly) Farnsworth's Image Dissector with Zworykin's Iconoscope in Part II of my article which will be found in this issue of *The AWA Journal*.

4. Many people, myself included, are less than pleased with some of the legal tactics later used by RCA to try to establish a monopoly in the area of electronic television at the expense of Philo Farnsworth. These unfair tactics, however, do not diminish the significance of Zworykin's electronic television work at Westinghouse and at RCA.

5. I wish to repeat that I have the highest regard for Farnsworth's work. However, it is the work of Zworykin, and not Farnsworth, that is the focus of my article.

JAMES P. RYBAK
Grand Junction, CO

CLASSIFIED SELLERS BEWARE!

Now that *AWA Journal* classified ads are displayed publicly on the AWA Web site, the increased exposure brings with it increased chances of being subjected to fraud.

I recently advertised my 23-tube Scott All-wave in a Windsor cabinet. There were no local offers, but I was e-mailed by a "Mrs. Meyer" in the UK. She offered me \$100.00 more than my \$2,500.00 asking price, which was suspicious in itself. Not only that but she proposed to send me a check for \$6,000 to cover my price plus the

cost of shipping.

"Mrs. Meyer" was to make the shipping arrangements with an international firm that would pick up the set and take care of everything. After deducting the shipping costs and my price, the remainder of the \$6,000.00 was to be returned by Western Union. However, I never received her address and phone number.

After I reluctantly agreed to the sale, I did indeed receive a check for \$6,000.00. But Gary Parzy, our Niagara Frontier Wireless Association club President, showed me some samples of internet fraud and convinced me that the offer was a scam.

I decided to simply tell "Mrs. Meyer" the deal was off, offering to return the check if she would send her address. But I never heard from her again.

Anyone who is (legitimately!) interested in this radio can contact me at dotlarryb@aol.com. I'm prepared to significantly discount the original asking price, but potential buyers must view the set at my home and be prepared to remove the 200-pound item from my basement.

LARRY BABCOCK
East Amherst, NY

A GOOD FRIEND OF AWA PASSES ON

You will read about the life of Muriel Isabella Lock in the "Silent Keys" column of this issue. She first traveled from the UK to the U.S. in 1988, when she attended the AWA conference of that year. Muriel was so taken with the people



Muriel relaxing at an English pub with long-time AWA Members Bart Lee (left, on a visit to the UK) and Alan Carter.

and the country that she made a yearly pilgrimage to the conference until the 2000 event, when she was 94 years young. She will be missed by many who had the pleasure of her company. I am one of them.

ALAN G. CARTER
South Croydon, Surrey, England



AWA NEWS



AWA JOURNAL POLICY ON PROMOTING EVENTS: The *AWA Journal* is pleased to list the meets and meetings of any established antique radio organization, whether or not it is associated with the AWA. Do not send your information directly to the *Journal* Editor. Please send it to Pat Muehlbauer, P.O. Box 108, Stafford, NY 14143. Closing date is six weeks prior to first day of month of issue.

Calendar of AWA Activities

CCAWA Events Summary (See Calendar of Meets)

April 13-14, 16-17

Linc Cundall Memorial
OT DX Contest

May 7

AWA, Inc. Board Meeting

May 6-7

IHRS/AWA Spring Meet

May 20-21

Radio Daze 2005

May 7

AWA Expanded Spring
meet

August 23-27

AWA Annual Conference

May 7

AWA Museum Board
Meeting

Calendar of Meets

(AWA logo identifies AWA-sponsored events)

LINC CUNDALL MEMORIAL OT DX CONTEST

April 13-14, 16-17

See "Amateur Radio" column in January issue.



NEARC SPRING SWAP MEET

April 23

To be held by The New England Antique Radio Club at Saint Stan's Hall, Pine Hill Rd, Nashua, NH. Hours: 7 a.m. to 12 noon. Flea market with over 100 tables; three radio contests. Admission during exhibitor set-up (7-8 a.m.), \$15.00; early admission (8-9 a.m.), \$5.00; general admission (after 9 a.m.), \$2.00. For more information, table reservations, directions, contact Meet Chairman Marty Bunis by phone (603-938-5051) or e-mail m_bunis@conknet.com. Or visit the NEARC web site at www.nearc.net.

CCAWA EVENTS SUMMARY

All swap meets take place on Saturday mornings from about 7 a.m. till 12 noon. Vendor setup is only \$5. Admission is always free.

May 7th 2005, Spring Swap Meet, Spencer NC
July 30, 2005, Summer Swap Meet, Valdese NC
October 22, 2005, Fall Swap Meet, Greens-



boro NC

Executive Committee meeting dates. All meetings start at 2 p.m. Sunday afternoon and end at around 5 p.m.

May 1st, August 7th, November 6th.

IHRS/AWA SPRING MEET

May 6-7

Indiana Historical Radio Society and AWA present their 34th Annual antique Radio Festival. The meet will be held again at the Johanning Civic Center located at 1500 N. Reed Rd., (US-31) on the north side of Kokomo, IN. Tentative set up times are 2 p.m. Friday with swap and sell from about 4 p.m. to 8 p.m. Saturday from 7 a.m. until about 3 p.m. There is plenty of space to set up inside the very large new facility. We will have help available for those who need it to carry their wares into the building. Tables will be provided at a nominal cost. No outside setup is permitted by the Center. An Old Equipment Contest will be held for members only. We encourage everyone to participate in, and witness, the Operational Radio displays. A detailed schedule of activities, including contest categories, seminars and Contest Awards banquet, as well as motel/hotel information will be published in the IHRS Bulletin and also at our web site at www.indianahistoricalradio.org. Many restaurants and motels are situated close by. A snack bar will be provided by the Civic Center. Advance registration is encouraged. Contact Fred Prohl IHRS treasurer and meet coordinator at (812) 988-1761 or Indianahistoricalradio@att.net. For Kokomo info contact Herman Gross at (765) 459-8308 or hw12x12ihrs@sbglobal.net.



AWA EXPANDED SPRING MEET

May 7

Once again an indoor event to be held at the Bloomfield Elementary School just around the corner from the A.W.A. Electronic Communication Museum Annex at 6910 Rt. 5 & 20 (intersection with Rt. 444). More details in "Museum News" column.



AWA MUSEUM BOARD MEETING

May 7

To be held at the A.W.A. Electronic Communication Annex at 1 p.m.



AWA, INC. BOARD MEETING

May 7

About 2 p.m. (following Museum board meeting) at the A.W.A. Electronic Communication Annex.



RCA SPRING QSO PARTY

May 7

All are invited to The Radio Club of America's first Spring QSO party. You do not need to be a member to participate. This is not a vintage equipment event. Contacts will be in voice mode, primarily ssb. Full details in "Letters" column.

RADIO DAZE 2005

May 20-21

Sponsored by Northland Antique Radio Club, AWA, and Pavek Museum of Broadcasting. At Comfort Inn of Plymouth, 194 and Highway 55, Plymouth, MN (763) 559-1222. Register by May 6; mention NARC. Flea market dawn to dusk on Friday; dawn to noon on Saturday. Auctions, contest, drawings, Saturday luncheon. Pavek Museum garage sale. Free admission to the museum with Radio Daze admission. For more information, visit the NARC website at www.geocities.com/northland.geo/prog05.html



ECARC ANNUAL SWAPFEST

May 21

Presented by the East Carolina Antique Radio Club at the Winterville, NC Kiwanis Club on 177 Forelines Road. Free admission; inside tables, \$15.00; outside tables, \$10.00. Contact Herman Schnur, K4CTG, 3205 Brick Kiln Rd., Greenville, NC 27858; 252-752-2264; hschnur@cox.net

BVWS GARDEN PARTY AND HARPENDEN MEET

June 4-5

Two renowned British Vintage Wireless Society events take place back to back on these dates in early June. They are the garden party at the Vintage Wireless Museum (June 4th in West Dulwich, London) and the Harpenden Swapmeet (June 5th at Harpenden Public Halls, Southdown Road, Harpenden). Both events are open to members only. Visit <http://www.bvws.org.uk/index.htm> for more details, including how to join.

RADIOACTIVITY 2005

June 10-12

Presented by the Mid-Atlantic Antique Radio Club. Again this year, the meet is being run on a

AWA LIFE MEMBERSHIPS ARE NOW AVAILABLE

Cost: \$400 (U.S.), \$500 (elsewhere). Send your check to AWA Secretary Pat Muehlbauer, P.O. Box 108, Stafford, NY 14143; (585) 343-6436; e-mail antiquewireless@yahoo.com.



Friday through Sunday format. Flea market and registration both open at 6:00 a.m. Friday to kick things off. The theme this year is RCA. There will be a special RCA theme auction Friday evening for quality RCA items only followed by a general auction of radios, tubes, literature and ephemera. Saturday night banquet with talk on history of RCA by Brian Belanger. Main auction on Sunday morning, followed by a walk-around, no-commission, "junkie" auction. Old Equipment Contest, seminars, bus excursion to the Radio and Television Museum in Bowie, MD. Location, same as last year: the Sheraton College Park in Beltsville, MD, between Baltimore and Washington, DC. Off I-95 at exit 29B, then turn left at first light and drive to rear of hotel. Hotel reservations: (800) 325-3535 or on line at www.starwoodmeeting.com/book/maarc. Info: Steve Hansman at 855 Arundel Dr., Arnold, MD 21012, (410) 974-0651, or visit www.maarc.org.

AWA ANNUAL CONFERENCE

August 23-27

At Rochester Institute of Technology Conference Center (formerly Thruway Marriott). Theme: Western Electric. See "Conference Preview" elsewhere in this issue.



Recurring Meetings & Events

- Antique Radio Collectors of Ohio—meets first Tuesday of each month at 2929 Hazelwood Ave., Dayton, OH (4 blocks east of Shroyer Rd. off Dorothy Lane) at 7 p.m. Also annual swap meet and show. Membership: \$10.00 per year. For more info, contact Karl Koogler: mail to above address; phone (937) 294-8960; e-mail karlkrad@gemair.com.

- California Historical Radio Society—For info on current meetings, call the CHRS hotline: (415) 821-9800.

- CARS, the Cincinnati Antique Radio Society—Meets on the third Wednesday of each month at The United Methodist Church, 7388 E. Kemper Rd. For more information contact Tina Hauke at (513) 247-9406.

- Carolinas Chapter of the AWA—Hosts four "mini-swap-meets" each year (in January, May,

July and October) plus an annual conference, "Spring Meet in the Carolinas," on the 4th weekend in March. Executive committee meets approximately quarterly. For more info, visit the web site at CC-AWA.ORG or contact Ron Lawrence, KC4YOY, Chapter President, P.O. Box 3015, Matthews, NC 28106-3015; phone (704) 289-1166; e-mail kc4yoy@carolina.rr.com

- Central Ohio Antique Radio Assn.—Meets at 7:30 p.m., third Wednesday of each month at Devry Institute of Technology, 1350 Alum Creek Rd., Columbus. (1-70 Exit 103B). Contact: Barry Gould (614) 777-8534.

- Delaware Valley Historic Radio Club—Meeting and auction begins 7:30 p.m. on the second Tuesday of each month. Location: Telford Community Center on Hamlin Ave. in Telford, PA. Annual dues: \$15.00, which includes a subscription to the club's monthly newsletter *The Oscillator*. For more info contact Delaware Valley Historic Radio Club, P.O. Box 5053, New Britain, PA 18901. Phone (215) 345-4248.

- The Downer's Grove (IL) Park District Museum sponsors a monthly "Collector's Hour." Participants have the opportunity to display collections at the facility for several weeks before making their individual presentations. The event is open to the public with no admission charge. The museum has also begun to sponsor a yearly "Collector's Fair." For more info, contact Mark Harmon, The Downer's Grove Park District Museum, 831 Maple Ave., Downer's Grove, IL, 630-963-1309, fax 630-963-0496, mharmon@xnet.com.

- Houston Vintage Radio Association (HVRA)—Meets monthly on the second Tuesday (April thru Oct) at Bayland Park, 6:30-9 p.m. in SW Houston. March and November meetings are held on Saturdays at the American Legion Hall off Alba Street in North Houston at 9 a.m. Each meeting includes an auction and program. Two one-day auctions are held each spring and fall. An annual convention is held in February. A newsletter, *The Grid Leak*, is published monthly. Membership is \$20/yr. Web site: www.HVRA.org. Write: HVRA, P.O. Box 31276, 77231-1276 or call Bill Werzner 713-721-2242 (e-mail: mingqi53@sbcglobal.net).

- Hudson Valley Antique Radio & Phono Society—Meets third Thursday of month, 7 p.m. meeting, swap meet, and membership info: Peter DeAngelo, President, HARPS, 25 Co. Rt. 51, Campbell Hall, NY 10916. (914) 496-5130.

- Indiana Historical Radio Society—Meets quarterly in Feb., May, Aug or Sept and Oct. Flea Market and Old Equipment Contest at all events. Auctions at all but Feb. meet. The *IHRS*

SUMMARY OF MINUTES

Antique Wireless Association, Inc.
Membership and Board of Directors Meetings

Membership Meeting, November 14, 2004

The meeting was called to order at 11:07 a.m. by President Bourne. Lauren Peckham read the secretary's report for the November, 2003 meeting for Joyce Peckham.

Geoffrey Bourne reported on the informal membership meeting that had taken place at the Annual Conference.

Ron Frisbie gave the board member nominating committee report and the results of the election, which were—Item 1 of the proxy For 673, Against 6, Abstain 10; Item 2 of the proxy For 670, Against 7, Abstain 13

The meeting was adjourned at 11:13 AM

Board of Directors Meeting, November 14, 2004

The meeting was called to order at 11:14 a.m. by President Bourne. Lauren Peckham read Joyce Peckham's resignation as Secretary of the AWA (due to health problems).

The board of directors accepted her resignation and thanked Joyce for all of her years of service to the AWA.

The board made Joyce an Honorary Member of the AWA and appointed Patty Muehlbauer as the new secretary and board member.

Ron Frisbie named the slate of officers for the next year. The nominations were accepted by the board and passed unanimously.

Geoff Bourne delivered the President's report, which was accepted by the board.

Patty Muehlbauer read the Secretary's report for the May 2004 meeting. Board accepted and passed.

Chris Fandt gave the Treasurer's report. Board accepted and passed.

Old Business

Membership Report by Patty Muehlbauer:

US members	3184
Canada members	143
Foreign members	112
Total membership	3439
Board accepts report.	

A report of the 2004 conference was given by Hugh Davey and Lauren Peckham. The conference ran with little or no problems and was a success.

Marc Ellis gave a report on *The OTB*, *Now The AWA Journal*. He submitted the new cover design, which was accepted by the board. He was commended on the fine job that he and his crew are doing.

The issue of AWA chapters was discussed at great length. Ron Frisbie stated, in his report, that many clubs had shown interest in this affiliation, but none had followed through except for the CC-AWA in Charlotte, NC.

Chris Fandt gave a report on Regional Meets associated with the AWA. Included were the AWA/VRPS in Houston, the AWA/IHRS in Indiana and others.

Marc Ellis read Chuck Schwark's report on the AWA internet site. The site is doing quite well. The AWA has gotten many new members from the site.

Alan Pellnat gave a report on copyright projects.

The name "Antique Radio Club of America" is now copyrighted and owned by the AWA. The report was accepted by the board.

Other items relating to the daily operation of the AWA were discussed.

New Business

Budget 2005: Chris Fandt gave the financials for the next year.

The board accepted and passed the budget.

Conference 2005: Hugh Davey, Lauren Peckham and Bruce Roloson reported on next year's meet. The theme will be Western Electric. Seminars are being lined up and the contest is in order. The RIT Inn will again be the conference site. At this point Lauren stepped down as Conference Program Chairman and the duties were divided up between Brian Belanger, Hugh Davey and Geoff Bourne for the 2005 conference. Randy Haus volunteered to be Program Chairman for the 2006 conference.

AWA Review Volume 18: Brian Belanger reported that he had a number of articles for the next *Review*. He has been looking at new publishers to get the unit price down and has received some favorable bids.

Other small items were discussed, and the meeting was adjourned at 4:10 p.m.

Bulletin has been published quarterly for the past 32 years. For meet details and information about the club and our Indiana Historic Radio Museum in Ligonier, IN see our Web site at www.indianahistoricalradio.org or contact Herman Gross, W9ITT, 1705 Gordon Dr., Kokomo, IN 46902-5977, (765) 459-8308, w9itt@mindspring.com

- London Vintage Radio Club—This Ontario, Canada club meets in London on the first Saturday of January, March, May, June and November. Annual flea market held in Guelph, Ontario in September in conjunction with the Toronto club. Contact: Lloyd Swackhammer, VE3IIA, RR#2, Alma, Ontario, Canada N0B1A0. (519) 638-2827. E-mail contact is Nathan Luo at lvrceeditor@yahoo.com.

- Mid-Atlantic Radio Club—Meets monthly, usually the third Sunday of the month at the New Hope Seventh Day Adventist Church, Burtonsville, MD. Contacts: President, Geoff Shearer, 14408 Brookmere Dr., Centreville, VA 20120, e-mail gshearer@cox.net; Membership Chair, Paul Farmer, (540) 987-8759, e-mail: oldradiotime@hotmail.com. Website www.maarc.org

- New Jersey Antique Radio Club—Meets second Friday each month, 7:30 p.m. Holds three annual swap meets. Contact (send SASE) Phil Vourtsis, 13 Cornell Pl., Manalapan, NJ 07726, (732) 446-2427.

- Northland Antique Radio Club—hosts four events with swap meets each year (in February, May, September and November) including an annual conference, "Radio Daze," for two days in mid-May. Annual dues are \$12.00, which includes a subscription to the club's quarterly newsletter. For more info, visit our web site at www.geocities.com/northland.geo/; contact Ed Ripley at (651) 457-0085; or write NARC, P.O. Box 18362, Minneapolis, MN 55418.

- Northwest Vintage Radio Society—Meets second Saturday of each month (except July and August), at or about 10 a.m., at Abemathy Grange Hall, 15745 S. Harley Ave., Oregon City, OR. Members display radios, exchange information. Guests welcome at all meetings and functions, ex-

AWA NETS

(EASTERN TIME)

PHONE

SUNDAY:

7237 kHz, SSB, noon (NCS:VARIOUS);
3837 kHz, AM 4:30 p.m.(NCSs: KA2J & W2AN)

TUESDAY:

14274 kHz, SSB, 2:30 p.m. (NCSs: KC3YE and W0FXV)
3837 kHz SSB, 8 p.m. (NCS: WB2SYQ)

MONDAY-WEDNESDAY-FRIDAY:

The AWA Bruce Kelley HF Net
3867 kHz, SSB, 9:30 a.m. (NCS: W2OBJ)

CW

DAILY, 4 p.m., 3588 or 7050 kHz. Protocol, informal. Check both frequencies for activity and join in, or call AWA de (your call) and see what you stir up. First WEDNESDAY of each month, 8 p.m., 7050 kHz

2-M REPEATER (Rochester Area)

MONDAY, 7:30 p.m. (NCS: K2GBR)
Receive 145.290 MHz
Transmit 144.690 MHz

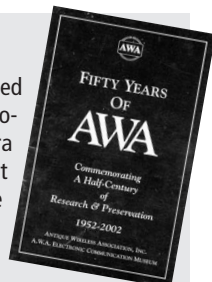
cept board meetings. For info, write the Society at P.O. Box 82379, Portland, Oregon 97282-0379.

- Oklahoma Vintage Radio Collectors—Oklahoma City Chapter meets second Saturday each month at Hometown Buffet, 3900 N.W. 63rd St., Oklahoma City, OK. Visitors welcome. Dinner/socializing, 6 p.m.; meeting at 7 p.m. Membership, \$12/yr., includes monthly *Broadcast News*. Info: SASE to OKVRC, P.O. Box 50625, Midwest City, OK 73140-5625; or contact Fred Kerner at (405) 769-4656 or fkerner@cox.net; or visit our web site at <http://members.cox.net/okvrc/>

- Ottawa Vintage Radio Club—Meets monthly

50TH ANNIVERSARY COMMEMORATIVE BOOKLET

Our 50th anniversary commemorative booklet *Fifty Years of AWA* has received high marks from everyone who has seen it. We still have a stock of this profusely-illustrated 60-page AWA history available for those who would like extra copies or those who were not members at the time of distribution and didn't receive one. Cost is \$7.00 per copy postpaid, no limit. But once they're gone they're gone—so act now if you are interested! Send your check to Pat Muehlbauer, P.O. Box 108, Stafford, NY 14143.



NOMINATIONS FOR AWA AWARDS

It is time to nominate candidates for six prizes to be given at the Annual Conference.

The **AWA Houck Award for Documentation** goes to an AWA member who has written several original articles on radio development or history in *The AWA Journal*, *AWA Review*, or other publication. (This can include a book on a related subject.)

The **AWA Houck Award for Preservation** is for a member who, through personal accomplishment, has acquired and preserved by documenting an outstanding collection of radio artifacts. Send your selection(s) to the Houck Awards Administrator, giving your reasons why the nominee(s) should receive the Award. The address: Barney Wooters, 8303 E. Mansfield Ave., Denver, CO 80237.

The **Bruce Kelley-Journal Award** is given to the member who publishes in *The AWA Journal* an article judged to be the most outstanding, original, historical presentation of the award year. For this year, articles in the July and October 2004 and January and April 2005 issues will be considered. The articles must have been written specifically for publication in *The AWA Journal*, not reprinted from other journals. All AWA members are eligible for this award except those on the Award Committee and the *AWA Journal* Editor. Simply identify the article and the nominee, with reasons for your selection; send to committee chairman Bob Thomas, W3NE, 216 Sunrise Lane, Philadelphia, PA 19118.

The **J. Albert Moore Award** is a newly-instituted companion to the Bruce Kelley-Journal Award. The award comes to us through The Antique Radio Club of America, which was

merged into AWA a few years ago. It was originally given for the most outstanding article (any category) contributed to the *ARCA Gazette* during the publication year. Though the award continues a memorial to Mr. Moore's contributions to ARCA, it has been re-oriented as a companion to the Bruce Kelley-Journal Award—honoring articles that do not fall into the historical category considered for the latter.

And so the Moore award will be given "... to the article, or series of articles, deemed to be the most outstanding of those dealing with radio hardware (radio sets, radio systems or components) printed in *The AWA Journal* during the award year. Eligible articles include those dealing with troubleshooting, restoration, performance evaluation, identification methods, and history." For this year, articles in the July and October 2004 and January and April 2005 issues will be considered. All AWA members are eligible for this award except those on the Award Committee and the *AWA Journal* Editor. Simply identify the article and the nominee, with reasons for your selection; send to committee chairman Thomas F. Peterson, Jr., 3060 Lander Rd., Cleveland, OH 44124.

The **Taylor Award**, in memory of John Taylor, RCA TV Developer, is for "preserving television history." Submissions are invited here, too, to Peter Yanczer, 835 Bricken Pl., Warson Woods, MO 63122.

The **Tyne Tube Award** is presented, in remembrance of Gerald F.J. Tyne, for contributions to preserving or documenting the history of tube technology. Nominations may be sent, with supporting reasons, to administrator Lauren Peckham, Box E, Breesport, NY 14816.

(except June and July) in the Conference Room, *Ottawa Citizen*, 1101 Baxter Rd., Ottawa, Ontario, Canada. Contact: Lea Barker at (613) 829-1804 or check www.ovrc.org. Membership: \$10 Canadian/yr.

• Pittsburgh Antique Radio Society welcomes visitors to our Saturday flea market/contests in March, June, September, and December. An auction is included in September, and our annual luncheon/program is held the first Saturday in December. Our newsletter, *The Pittsburgh Oscillator*, is published quarterly. Web site: www.nb.net/~schaefer/pars.html For directions, specific dates, information call President Bonnie Novak at 412-481-1563 or write to Karl Laurin,

8111 Sally, White Oak, PA 15131.

• Society for Preservation of Antique Radio Knowledge—Meets at 7:30 p.m. the second and fourth Tuesdays of each month in the party room at Cassano's Pizza Parlor, 1700 East Stroop Rd., Kettering, OH. Membership, \$18/year. Write SPARK Inc, P.O. Box 292111, Kettering, OH 45429; e-mail sparkinc@juno.com or call John Pansing at (937) 299-9570.

• Texas Antique Radio Club—Meets alternate months in Kyle and Shertz, TX. Contact: Ron Manning, President TARC, 133 East Huisache Ave., San Antonio, TX 78212. Phone (210) 734-6831; e-mail ronmeg@gateway.net; Web site www.gvtc.com/~edengel/TARC.htm.

ANTIQUE WIRELESS ASSOCIATION, INC.

BALANCE SHEET

As of October 31, 2004

ASSETS					
Current Assets			1231 ALGER SMALL CAP FUND	8,015.70	
Checking/Savings			1230 ALGER MID CAP FUND	<u>20,012.96</u>	
1078 A HSBC CHECKING- CLUB	<u>24,153.58</u>		Total 1200 A MARKETABLE SECURITIES	<u>231,268.93</u>	
Total Checking/Savings	24,153.58		Total Other Assets	<u>231,268.93</u>	
Other Current Assets			TOTAL ASSETS	<u>334,553.88</u>	
Certificates of Deposit			LIABILITIES & EQUITY		
1102C CHASE 48 MONTH CD	26,570.63		Liabilities		
1057 CITIBANK 36 MO CD Mat. 6/07	5,234.34		Current Liabilities		
1102 CHASE-24 MO. CERT.	6,772.59		Accounts Payable		
1103 CHASE-36 MO. CERTIFICATE-CLUB	21,409.33		3020 ACCOUNTS PAYABLE	<u>14,330.09</u>	
1105 CHASE-24 MO. CD 12/05 1.65%	<u>19,144.48</u>		Total Accounts Payable	<u>14,330.09</u>	
Total Certificates of Deposit	<u>79,131.37</u>		Total Current Liabilities	<u>14,330.09</u>	
Total Other Current Assets	<u>79,131.37</u>		Total Liabilities	14,330.09	
Total Current Assets	103,284.95		Equity		
Other Assets			3800 RESERVES FOR AWARDS	5,990.10	
1200 MARKETABLE SECURITIES			3900 NET ASSETS	280,036.19	
1233 MERRILL LYNCH MONEY MARKET ACCT	57,894.73		Net Income	<u>34,197.50</u>	
1232 MERRILL LYNCH MONEY MARKET	87,460.00		Total Equity	<u>20,223.79</u>	
1255 FIDELITY ASSET MGMT MF	57,885.54		TOTAL LIABILITIES & EQUITY	<u>34,553.88</u>	

ANTIQUE WIRELESS ASSOCIATION, INC.

PROFIT AND LOSS

November, 2003 through October, 2004

Ordinary Income/Expense					
Income			8065C OFFICE SUPPLIES-CLUB	422.78	
6075c AWA REVIEW 16	19.95		8066C Office Equipment	1,022.00	
6100C MEMBERSHIP BY CREDIT CARD	2,520.00		8067C ACCOUNTING	1,212.00	
6805C CONFERENCE BOOK FAIR	3,086.00		8068C LEGAL	100.00	
6007C MISCELLANEOUS INCOME - CLUB	7.00		8070C BAD CHECKS	178.00	
6010C CLUB MEMBERSHIP DUES	69,336.45		8060C GENERAL POSTAGE-CLUB	1,677.33	
6020C INT ON BANK ACCOUNTS - CLUB	6,017.38		8091C BOARD MEETING COSTS	1,460.58	
6045C SALES	90.00		8092C BOARD MEETING TRAVEL	280.96	
6800 CONFERENCES			8115C ADVER AND PHOTOGRAPHY	2,190.30	
6800C CONFERENCE - GENERAL 000	17,221.05		8120C COPYRIGHT	587.00	
6803C CONFERENCE PREREGISTRATIONS	16,739.00		8160C TELEPHONE-CLUB	1,302.58	
6804C CONFERENCE REGISTRATIONS	<u>8,833.00</u>		8191C MISC. EXP.-CLUB	19.95	
Total 6800 CONFERENCES	<u>42,793.05</u>		8192C AOL SERVICE-SECRETARY	568.35	
Total Income	23,869.83		8300 CONFERENCE EXPENSES		
Cost of Goods Sold			8301C CONFERENCE-MISC. COSTS	702.77	
8119C COST-AWA REVIEW 17	7,738.98		8302C CONFERENCE-AUCTION PAYOUTS	16,177.45	
8118 REVIEW 16	<u>0.00</u>		8303C CONFERENCE SUPPLIES	87.61	
Total COGS	<u>7,738.98</u>		8304C CONFERENCE TRANS-BUS, SHUTTLE	3,050.00	
Gross Profit	116,130.85		8305C CONFERENCE AWARD MATERIALS	142.78	
Expense			8306C CONFERENCE FORMS-PRINTING	945.71	
8043 OTB COVER REDESIGN PROJECT	171.00		8307C CONFERENCE BADGES	593.49	
8006 ROCHESTER HAMFEST BOOTH	62.50		8308C CONFERENCE SECURITY	1,408.00	
8312 CONFERENCE ADVERTISING	2,742.34		8309C CONFERENCE REG. REFUNDS	416.00	
8000C OTB EXPENSES			8310C CONFERENCE CASH DRAWER SETUP	0.00	
8040C OTB PRINTING AND ASSEMBLING	23,932.00		8311C CONFERENCE HOTEL BILL	<u>14,330.09</u>	
8047C OTB-STUFFING & MAILING	550.00		Total 8300 CONFERENCE EXPENSES	<u>37,853.90</u>	
8050C OTB-STAMPS	<u>14,300.00</u>		Total Expense	<u>96,982.83</u>	
Total 8000C OTB EXPENSES	38,782.00		Net Ordinary Income	19,148.02	
8001C BANK SVC CHARGE	774.02		Other Income/Expense		
8004C HF CONTESTS	168.69		Other Income		
8011C CREDIT CARD CHARGES	552.73		9500 Unrealized Gain (loss) on Inves	<u>15,049.48</u>	
8016C COMPUTER SOFTWARE	179.99		Total Other Income	<u>15,049.48</u>	
8030C INSURANCE-OFF. & DIR. LIAB.	763.83		Net Other Income	15,049.48	
			Net Income	<u>34,197.50</u>	

Service Sources Available

The AWA Source Sheet is a listing of parts suppliers and services for the radio collector. Cost: only a business-size self-addressed stamped envelope to AWA, Box E, Breesport, NY 14816.

AWA VHS Video Programs

The Antique Wireless Association has available several historical documentaries to loan to affiliated organizations for club meetings and programs. There is no charge for this service other than return mailing cost. For info on loan conditions, to make reservations, or just inquire, contact Ed Gable, Curator, AWA Electronic Communication Museum, 187 Lighthouse Rd., Hilton, NY 14468. The following are available:

V-2 — “Electrons on Parade.” 18 min. 1938 movie made at RCA’s Harrison Plant showing production lines with closeups showing receiving tubes, including a short sequence on transmitting tubes. (Very rare movie.)

V-4 — “The British Receiver.” Documentary of the AWA/BVPS meet with visit to Marconi’s Chelmsford plant, the British Science Museum, and ending with series of collectible British receivers. (VHS program transferred from slides.)

V-5 — “The Early Years.” Historical documentary narrated by Clarence Tuska telling of the early years of amateur radio, founding of the ARRL and WWI military radio training school. (VHS program transferred from slides.)

V-6 — “The Key.” History of the telegraph/radio key covering early hand keys, semi-automatics and commercial types. Script by Lou Moreau, W3WRE. (VHS program transferred from slides.)

V-9 — “The Transatlantic Tests and 1BCG.” Rare documentary/photographs showing early amateur operation leading to famous 1921 transatlantic tests.

V-12 — “Those Wonderful Magazine Covers.” The story of radio through magazine covers. Colorful with period music.

V-15 — “The WHAM Story.” Details development of a pioneer radio station in Rochester, NY. Program developed with assistance and recollections of Art Kelly, the station’s former general manager.

V-16 — “The Charles Herrold Story.” Video prepared by Mike Adams who donated this copy to the AWA. It documents the work of broadcasting’s Forgotten Father who started broadcasting in 1912. Now also available in DVD format as well as VHS. 

FROM THE EDITOR, continued from page 5

volunteer. After a couple of phone conversations during which we compared our needs with his availability and interests, Joe decided to take on the job of being *The AWA Journal’s* Copy Editor.

In this position, Joe has set standards for how our words are set in type—determining styles for electrical units, standard spelling and abbreviations, punctuation and capitalization, and all of the other myriad decisions that have to be made if our authors’ ideas are to be transferred to the printed page with clarity. He also reads all galley proofs to make sure that those standards are adhered to.

This service has been a Godsend, especially with our high volume of copy and tight deadlines. Joe is able to review up our galleys with a fresh and critical eye, keeping us on track and consistent. And he brings a wealth of experience to this task.

Joe was the founding editor and producer of *HR Report*, the first amateur Radio newsletter, and a member of the editorial staff of *Ham Radio* magazine, where he was a regular columnist and frequent editorial writer. He is a long-time mem-

ber of the AWA and the Antique Radio Club of Illinois.

Joe has been an active radio amateur since 1946, at the top of the DXCC honor roll since 1979, a VHF/UHF enthusiast with WAS, WAC and DXCC on six meters, and an AMSAT life member and former Area Coordinator. He’s also a Life member of both ARRL and QCWA, has served the ARRL as a member of the VHF/UHF advisory committee and the FCC as a member of the advisory committee on Amateur Radio for the World Administrative Radio Conference of 1979.

Professionally, Joe has had his own electronics consulting business for close to forty years, doing technical writing, advertising and marketing for a variety of small electronics firms. He was also a Managing Editor of *Electronics Instrument Digest*, has long been a staff editor for DBI Books, owns Handgun Press, a small book publishing company, and has authored many books and articles in the gun collecting field.

Thanks a lot Joe! I hope we’ll be working together for many years to come.

—Marc Ellis

MUSEUM NEWS

Visit us on the Internet at <http://www.antiquewireless.org>

OFFICERS

Director

Thomas Peterson, Jr.

Deputy Director

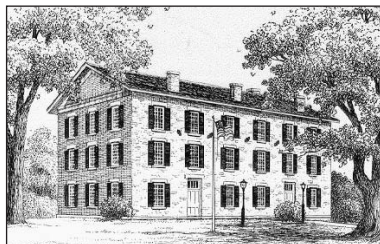
Allan Pellnat, KX2H

Secretary

Edward M Gable, KZMP
(acting)

Treasurer

Stanley J. Avery, WM3D



MUSEUM TRUSTEES

Stanley J. Avery, WM3D

Dr. Thomas Ely, W2ODW

Ronald Frisbie*

Edward Gable, K2MP*

Prof. William Hopkins, AA2YV

Lauren Peckham*

Allan Pellnat, KX2H*

Thomas Peterson, Jr.*

Ronald Roach, W2FUI

Ronald Walker, WA2TT

Morgan Wesson

Roy Wildermuth, W3RLW

MUSEUM CONTACT

For all inquiries about the Museum and its operation, contact Edward M. Gable, Curator, 187 Lighthouse Rd., Hilton, NY 14468. Phone: (585) 392-3088, e-mail: egable@rochester.rr.com.

The AWA Electronic Communication Museum is an IRS 501(c)(3) charitable organization.

*also on AWA Inc. Board of Directors

Greetings from your Museum crew. I hope you are all enjoying a nice change into spring time. We had a tough enough winter and certainly deserve a break. The late winter cold and persistent snow really cut into available museum work sessions. On some days the roads were impassible even for winter-hardened life-long upstate New Yorkers like many of the volunteers. Other days were just too cold to ask people to volunteer. As a result, some plans were postponed or at least delayed a bit.

Nevertheless, a lot of progress was made two very important areas: Spring Meet planning and preparing for the 2005 Museum opening. And speaking of the Spring Meet, I trust you have all penned in the May 7th Meet date and plan to be there for a full day of enjoyment with your fellow AWAers and vintage communication enthusiasts. Now surpassing 30 years of continuous operation, the AWA Spring Meet is bigger and better than ever.

The inside venue will again feature a flea market open to the public, exciting programming, the ever popular Annex "stuff" auction, commercial vendors and tours of the Annex and Museum. In response to several requests, this year we will have some spaces for flea market people who, on a good day, wish to set up outdoors.

Ron Roach, W2FUI, who is this year's General Chairman, says the schedule of events remains similar to last year's with an early set up time for vendors and flea people... but no early selling. The flea market opens at 8:00 a.m., then programming, then the auction, more flea mar-

ket, and at 1:00 p.m. a tour of the Annex followed by the 2:00 p.m. Museum opening.

The AWA, Inc. Board of Directors and the AWA Electronic Communication Museum Trustees will have scheduled meetings in the afternoon. For weekly updates on schedule enhancements, news of vendors and programs, visit the Spring Meet info page at www.awamuseum.org. As always your Museum crew is most pleased to have your Museum open for the season.

Our thanks go to now out-of-state staffer Allan Pellnat, who is also your Deputy Director, for continuing the difficult task of scheduling Museum guides for the year. We regret the loss of several long time guides who have so ably assisted in this important position in the past. We are an aging group and this is the reality of the situation. Although we do tap folks on the shoulder now and again to fill guide positions, I know there are volunteers out there too shy to ask or afraid that they might not "qualify." Nuts! All are welcome and training is provided.

As I have said many times, and I truly believe it, acting as a Museum guide and meeting the visitors is a wonderful, rewarding experience. Contact me or any of the museum staff with questions.

Speaking of visitors and contacts, I was pleased to be asked by the communications class at Rochester's St. John Fisher College to be a guest lecturer. I discussed the topic of radio from Marconi through the birth of broadcasting with the help of a PowerPoint presentation. Of course I included many pictures of museum artifacts to help make my points and impress the audience

on the breadth of our collection.

While working on the presentation I was reminded of an AWA member incentive suggested by club V.P. Brian Belanger. Brian suggested that the AWA prepare “canned” lectures or presentations that could be delivered by any AWAer to any interested audience. I think this idea has a lot of merit, since it encourages members to be spokespersons for our organization and interests. It seems to me that it is our duty to help you in that endeavor. More to follow.

We rarely speak of our advertising supporters but they are important to us and also provide a great service to our members. Please take a moment to look at our Business Card ads and learn what services are available to you. If you would like to insert an ad, the rate is an extremely reasonable fifteen dollars for a single insertion, or fifty dollars for a full year. See the Business Card Ad masthead for details. While there, look also on the back page for information on how to order from the Museum Store. *AWA Review 17* is available and selling well. Make sure your *Review* collection stays unbroken! S’long for now...

Ed Gable

Ed Gable k2mp/w2an
Museum Curator

SUMMARY OF MINUTES

A.W.A. Electronic Communication Museum
Membership and Board of Trustees Meetings Museum
Membership Meeting, November 14, 2004

1. Meeting Called: The meeting of the Members of the A.W.A. Electronic Communication Museum (AWAECM) was called to order by Director Thomas Peterson, Jr. The venue was the RIT Inn and Conference Center, Rochester, NY. No members in attendance. All current Officers and Trustees were in attendance except Trustees Wesson and Peckham. Lauren Peckham was excused due to illness in the family.

1.1 A moment of Silence was observed in memory of passing member Robert Perry.

2. Meeting Minutes: Acting Secretary E. Gable reported that the minutes of the last Membership meeting, November 9, 2003, were mailed to each officer and trustee and provided a brief narration of the contents. There being no additions or corrections, R. Walker moved to accept, seconded by R. Frisbie, Approved.

3. Proxy Report: Ronald Frisbie, acting as Chairman of the Proxy Committee, reported that 683 valid proxies had been received as of 13 November 2004.

4. Number of Trustees: Director Peterson asked Ronald Frisbie, acting as Chairman of the Proxy Committee, to report on Proxy item #1, the motion to set the number of Museum Trustees to 12. Ron Frisbie reported 672 votes FOR, 3 AGAINST and 8 ABSTAIN. Additionally there was one vote FOR the motion from those attending. A. Pellnat moved to accept, seconded by T. Ely, approved.

5. Election of Museum Trustees: Director Peterson asked Ronald Frisbie to report on Proxy Item #2, the election of names identified on the proxy and specified expiration terms. Ron Frisbie reported 665 votes FOR, 4 AGAINST and 14 ABSTAIN. Additionally there was one vote FOR the motion from those attending. A. Pellnat moved to accept, seconded by T. Ely, approved.

6. Secretary Gable welcomed new Museum Trustee Roy Wildermuth to the Board. (Applause)

7. Annual Report: As there were no members at large in attendance Director Peterson deferred his report to the following Trustees Meeting.

RECENT MUSEUM DONORS

- ❖ Richard LeVegue WA2HFU.....Viking II with VFO and Matchbox. Scope, more
- ❖ Tom Perera W1TPSiemens & Halske telegraph inker and key with clockwork mechanism, circa 1880
- ❖ David CunninghamScott Stereo Master, Quaker Oats xtal set, 150 tubes
- ❖ Rochester Amateur Radio Assn ..German WW2 RX, Torn Eb. 24b-205
- ❖ Betty Glaser500 vacuum tubes, Weston 685 tube tester circa 1930, Westinghouse KMB active antenna coupler
- ❖ Duncan Brown K20EQVacuum tube, GE ZP579, marked “secret”
- ❖ Marc Ellis N9EWJVic-20 with ham RTTY/CW interface, tape drive, memory expansion, Amdek monitor
- ❖ Bob Hobday N2EVGKodak Carousel projector with trays
- ❖ Kenneth Jackman WA2DPM....Philco 42-350 with Armstrong FM band
- ❖ Beatrice JonesWW2 RTTY Equipment, BC-614H speech amp
- ❖ Lew HaleyRG-213 Coax
- ❖ Paul A. RobertsonVoice Link Technology flip-phone-like device, pre-cell-phone era
- ❖ Ottavio Pezzi WB2WNOUtica 650 with VFO
- ❖ Paul BrennonAutomatic P-651 car radio, early
- ❖ Nolan StefanyTube tester, RCA Selectovision with discs, more
- ❖ Alfred BalkCash

8. Adjourn: Tom Peterson asked for any other business, and there being none, T. Ely moved to adjourn, seconded by A. Pellnat. Approved.

Edward M. Gable
Secretary

BOARD OF TRUSTEES MEETING NOVEMBER 14, 2004

1. Meeting Called: The meeting of the Board of Trustees of the A.W.A. Electronic Communication Museum (AWAECM) was called to order by Director Thomas Peterson, Jr. The venue was the RIT Inn and Conference Center, Rochester, NY. All current Officers and Trustees were in attendance except Trustees Wesson and Peckham. Lauren Peckham was excused due to illness in the family.

2. Meeting Minutes: Acting Secretary Edward Gable reported that minutes for the previous meeting were e-mailed to each Trustee by Secretary Bob Perry. He then provided a brief overview of the minutes from the May 1, 2004, meeting. A. Pellnat moved to accept, seconded by R. Walker. Approved.

3. Election of Officers: Ronald Frisbie, as Chairman of the Nominating Committee, provided the following slate for the term covering 2004/2005: Director, Thomas Peterson, Jr.; Deputy Director, Allan Pellnat; Treasurer, Stan Avery; Secretary, Edward Gable. R. Frisbie moved to approve, seconded by R. Wildermuth, approved.

4. Treasurer's Report: Treasurer Stan Avery issued copies of accounting reports generated by our accounting firm Heveron and Heveron. The reports consisted of the Balance Sheet and Profit and Loss Statement of activities through the period November 1, 2003 to October 31, 2004, with the actual report dated 11/12/04. It was observed that there was no inventory for *Review 16*.

As part of this report Curator Ed Gable presented his budget results and the budget for the 2004/2005 operating year. During review, Treasurer Avery reported that a check for \$1800.00 was received from the AWA Inc. for "Percent of Conference General Auction," thus bringing the total income to \$19,575 and showing a balanced budget. E. Gable will make a permanent change to the final report. Curator Ed Gable also presented the "Fund Balance Report" for the operating year.

There being no further discussion, R. Frisbie moved to accept the Treasurer's report, seconded by R. Roach. Approved. The Secretary was directed to file a copy of the accounting report, and the updated budgets, with the meeting minutes in the Corporation files.

5. Museum Report: Director Peterson referred to the Museum Report given by Curator Ed Gable in the previous Board Meeting of the AWA, Inc. As all in attendance had already heard the report, and as they all have a written copy of the report, reading of the report here was waived.

6. AWA, Inc. Contributions and Transfers: At the previous AWA, Inc. Board Meeting it was revealed that *Review 17* would be transferred to the Museum in the same manner as before, i.e., the Museum would take sales revenue for those *Reviews* sold after the 2004 Conference. An issue arose with the timeliness of reports coming from the Conference Committee in regard to Museum consignment sales. The Conference Committee acknowledged they need to do better and will work on improved procedures.

7. Museum/Historical Society Lease: The current lease for the Museum location, currently at \$1,000 per year, expires on June 31, 2005, with an automatic 5 year renewal after price negotiations. The Trustees discussed options. Based on the fact that the unheated space will be hard to rent, and that Director Peterson made a personal contribution of \$5,000 to help with roof repairs, and that five years will give us enough planning time, we concluded that our offer of \$1,200 per year, for 5 years, with a renewal clause, will be our negotiating plan. Our intent needs to be offered no later than Jan 1, 2005. Tom Peterson Actionee.

8. Site Plan Discussion and Proposal: Curator Ed Gable reported that he has been working with a local (Bloomfield, NY) site planner regarding building on our property at 1910 Route 5&20 in Bloomfield, NY. The idea to build an improved facility, for both display and much improved collection storage, has been discussed for several years with no formal Trustee action. Gable is requesting no more than \$2,800 to develop a site plan with sufficient detail and certifications to act as the vehicle to obtain a building permit. In-

cluded would be the design and costing of a special septic system required on the property.

In support of the need, Curator Gable presented a copy of a letter from Robert Lozier, a long term, well respected member, who expressed genuine concern for the safety of the collection under current conditions of minimal environmental controls.

Discussion topics included the future of the museum building needs which seems to focus on the needs of researchers and members and less on the general public and to the point of discouraging bus loads of school kids and the like. It was further discussed that even if we did or did not build here we would have to have this site plan and costing as a planning tool.

The proposal then is to accept the estimate of Arthur Babcock, dba Kent Land Surveying, dated 6/25/04, for an amount not to exceed \$2,800. Further, the amount of \$2,500 from the current Building Fund Balance will be used to cover the majority of the cost. Motion to approve by A. Pellnat, seconded by R. Roach. Approved. Ed Gable is Actionee. The Secretary was directed to reply to Mr. Lozier and thank him for his proactive interest and support.

8. Joint Venture, Rochester Museum and Science Center: Director Peterson expressed an interest in providing portable exhibits and more outreach programs to improve the image of the museum. Ed Gable reported that he is aware of a venture with the RMSC and a local ham radio club and will look into that as an option. Further, one of the RMSC exhibit people is aware of the AWAECM, is a radio enthusiast and may be a helpful contact. Director Peterson gave guidance regarding the need to establish ownership and insurance matters on loaned artifacts and to get good publicity photos and stories. E. Gable is actionee.

10. Discussion - Ed Gable's Retirement: Curator Gable previously reported that he plans to retire May, 2006. He detailed that to say he planned to remain very active with the Museum and that his main interest was to step away from the day-by-day detailed operations of the Museum; planning activities, scheduling guides, opening/closing for the work sessions, and the like. Ed expressed a deep concern for the collection and conceded that perhaps the Curator position is to his liking, but that the other current duties need to be defined and redistributed. Director Peterson requested that Mr. Gable generate a list of his current duties, prioritized to likes and dislikes, and present them to the Board. E. Gable agreed and has the action.

11. Discussion - Offer to buy Artifact: Curator Gable reported that the Museum received a firm offer of \$8,000 to purchase an artifact from the key collection. It is a unique item, worth at least that amount, perhaps more, and is the only one in the collection. Discussion points included question as to the real value. Ed Gable to try and get an estimate. We further identified the acquisition fund to be well funded and we didn't need the money. A concern was expressed about member and donor concern to the safety of their donating to the AWAECM.

Curator Gable reminded people of a long standing Museum policy of selling items only after proper de-accessioning and then only on an equal basis to a wide membership base via an AWA Auction or bid sale. After discussion it was Curator Gable's discussion to not sell the item. No Trustee action necessary.

12. Other business: Director Peterson asked for other business to be brought before the Board of Trustees. There was none.

13. Close: Director Peterson concluded with general comments and thanked the Board for their work in support of the Museum. R. Walker moved to adjourn, seconded by T. Ely. Approved.

Direct Monies authorized: \$2,800

Action items: Avery: *Review 16* Inventory for Heveron & Heveron Report

Gable: Add \$1800 to Budget reports

Peterson: Work with Historical Society on Lease

Gable: Work with Kent Land Surveying on Site Plan

Gable: Communicate with Bob Lozier

Gable: Form Committee to work with Joint Ventures/Outreach

Gable: Generate work list

Gable: Write to purchase offerer to decline

Respectfully submitted by:
Edward M. Gable, Secretary

AWA ELECTRONIC COMMUNICATION MUSEUM
BALANCE SHEET
As of October 31, 2004

ASSETS					
Current Assets				1616. AWA REVIEW 8	596.00
Checking/Savings				1615. AWA REVIEW 7	711.00
1080. HSBC CKING.MUSEUM		50,064.76		1614. AWA REVIEW 6	562.00
Total Checking/Savings		50,064.76		Total 1600. INVENTORY	36,980.61
Other Current Assets				1330M. BANK ACCT.INTEREST	2,363.57
Certificates of Deposit				Total Other Current Assets	294,724.41
1115M. FLEET 24 MONTH CD		15,933.92		Total Current Assets	344,789.17
1057M. CITIBANK 36 MONTH CD		36,656.72		Fixed Assets	
1111M. ESL36MO.CDMat.10/06 2.37%		85,071.83		2400. LEASEHOLD IMPROVEMENTS	5,386.38
1104M. ESL MONEYMAKER 1.05%		79,726.20		2405. STORAGE BUILDING	88,549.02
1042. ESL MONEY MARKET-MUSEUM		7,209.08		2450. DEPR. RES ON STORAGE BUILDING	-44,153.48
1043. ESL MONEY MARKET RESTR.-MUSEUM		3,971.09		2499. DEPR. ON ELECTRONIC COMM. MUSEUM	5,386.38
1108. ESL-30 MO. CD Mat. 10/06 1.8%		26,644.72		2500. LAND. LEGION PROPERTY	16,562.89
Total Certificates of Deposit		255,213.56		2510. COMPUTER EQUIPMENT	2,641.98
1400. PREPAID EXPENSES				2545. DEPR. RES. ON COMPUTER EQUIPMENT	-2,641.48
1406. PREPAID RENT		166.67		Total Fixed Assets	60,958.93
Total 1400. PREPAID EXPENSES		166.67		TOTAL ASSETS	405,748.10
1600. INVENTORY				LIABILITIES & EQUITY	
1623. AWA REVIEW 15		16,941.00		Equity	
1622. AWA REVIEW 14		10,970.43		3900. NET ASSETS	398,433.01
1621. AWA REVIEW 13		4,934.43		Net Income	7,315.09
1618. AWA REVIEW 10		2,265.75		Total Equity	405,748.10
				TOTAL LIABILITIES & EQUITY	405,748.10

AWA ELECTRONIC COMMUNICATION MUSEUM
PROFIT AND LOSS
November, 2003 through October, 2004

Ordinary Income/Expense				8034M.INSURANCE.BUILDING	535.00
Income				8035M.NEW BUILDING FEASIBILITY STUDY	0.00
6007M.MISCELLANEOUS INCOME.MUSEUM		30.00		8056M.RENT TO HISTORICAL SOCIETY	1,000.00
6008M.CONTRIBUTIONS.BUILDING		0.00		8060M.GENERAL POSTAGE	319.80
6010M.MUSEUM STORE INCOME		388		8061M.GROUNDS KEEPING	386.00
6020M.INT ON BANK ACCOUNTS.MUSEUM		6,072.72		8062M.GAS	779.56
6024M.AWA PUBLICATION INDEXES		61.00		8063M.ELECTRICITY	1,304.07
6025M.DISPLAY ADS IN OTB.MUSEUM		300.00		8064M.WASTE WATER SERVICE	110.00
6030M.AUCTION PROCEEDS		0.00		8065M.OFFICE SUPPLIES	306.88
6036M.CONTRIBUTIONS. MUSEUM		2,103.50		8067M.ACCOUNTING	1,205.00
6039M.SPRING MEET INCOME		917.85		8069M.BUILDING MAINTENANCE	534.20
6041M.OLD CONF.OTB/REVIEW BK SALES		0.00		8071M.ARTIFACT MAINT./RESTORATION	63.28
6070M.SURPLUS EQUIPMENT SALES		2,108.00		8072M.ARTIFACT ACQUISITION.FUND	252.52
6072M.ARTIFACT ACQUISITION FUND		0.00		8073M.LIBRARY BOOKS	39.49
6802M.OLD OTB & REVIEW SALES		9,050.37		8074M.LOCAL CONTRIBUTIONS BY MUSEUM	50.00
6806M.CD ROM SALES		2,115.40		8075M.ALARM SYSTEM	130.00
Total Income		23,846.95		8090M.SPRING MEET EXPENSES	442.04
Gross Profit		23,846.95		8115M.ADVERTISING AND PHOTOGRAPHY	323.20
Expense				8130M.VOLUNTEER APPRECIATION	877.03
8001M.Bank Service Charge		90.71		8150M.MEMBERSHIPS	55.00
8014M.COMPUTER SUPPLIES.MUSEUM		877.39		8155M.WATER	56.00
8016M.COMPUTER SOFTWARE. MUSEUM		259.00		8160M.TELEPHONE	1,184.23
8022M .DEPR.ON ANNEX		0.00		8167M.OTB & REVIEW SALE SUPPLIES	305.25
8025M.MUSEUM SUPPLIES		178.53		8168M.OTB & REVIEW SALE POSTAGE	567.55
8027M.MUSEUM RENT		0.00		8192M.BOARD MEETING EXPENSES	376.38
8028M.MUSEUM STORE EXPENSES		423.72		Total Expense	16,531.86
8030M.INSURANCE.FINE ARTS COLLECTION		2,401.00		Net Ordinary Income	7,315.09
8031M.INSURANCE.FIRE, THEFT-MUS.ANN.		1,099.03		Net Income	7,315.09
8032M.DEPR. ON COMPUTER		0.00			

AWA ANNUAL CONFERENCE

RIT Conference Center, Rochester, NY
August 23-27, 2005 Theme: *Western Electric*

WELCOME BACK! At the 44th annual conference, collectors and history enthusiasts will convene, exchange equipment, and learn more about the development of radio and electronics. If you have never been to the yearly "reunion," why not give it a try? Rochester (Henrietta) is just north of upstate New York's beautiful Finger Lakes region, easily reached by car or plane. The site is 26 easy miles from the AWA Museum at Bloomfield.

Advance registration is encouraged to facilitate preassembly of registration materials and preassignment of flea market spaces. Your materials for advance registration will be included in the July issue of *The AWA Journal*. There will be unlimited registration at the door.

The conference site is The Rochester Institute of Technology Conference Center. Formerly the Thruway Marriott Hotel, This is the same facility where we've been running the conference for many years. It offers special nightly rates of \$89.00 for a single or double. Get your reservation in early! For info or reservations, call (585) 359-1800. The conference center has restaurant facilities, and other lodging and eating places are nearby.

The hotel is reached from Exit 46 of the new

York State Thruway (I-90): take I-390 north to NY 253 west, to NY 15 south. For visitors arriving by air, the location is about seven miles or 15 minutes from the airport. There is shuttle service, 6 a.m.-11 p.m. (specify the RIT Conference Center). If you take a cab, make sure the driver understands that you are NOT going to the RIT campus, but rather to the RIT Conference Center.

Conference Chairperson
HUGH DAVEY

Program Chairpersons (Acting)
HUGH DAVEY
GEOFFREY BOURNE

Registration
BILL FIZETTE

Contest Coordinators
GEOFFREY BOURNE
CHRIS BACON



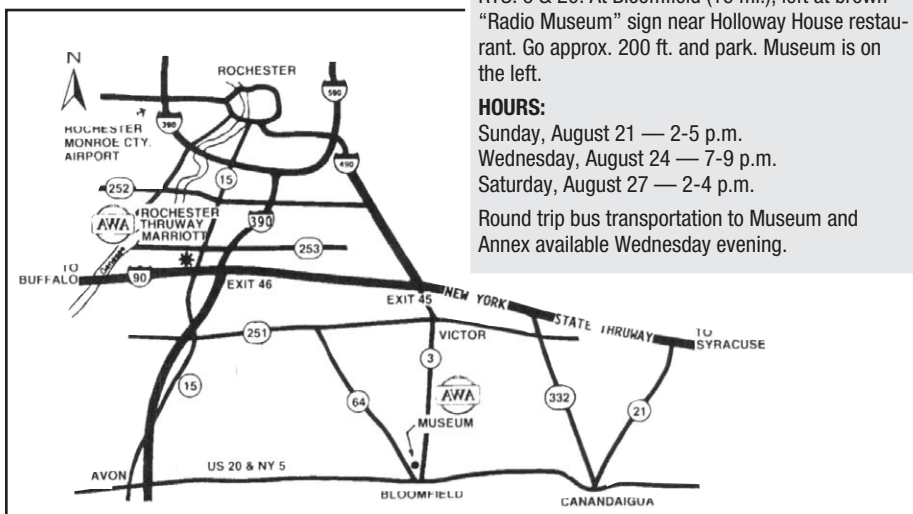
AWA ELECTRONIC COMMUNICATIONS MUSEUM VILLAGE GREEN, BLOOMFIELD, NY

Refer to map at left. Directions from hotel: Right (south) on Rt. 15. At Avon (9.5 mi.), left (east) on RTS. 5 & 20. At Bloomfield (16 mi.), left at brown "Radio Museum" sign near Holloway House restaurant. Go approx. 200 ft. and park. Museum is on the left.

HOURS:

Sunday, August 21 — 2-5 p.m.
Wednesday, August 24 — 7-9 p.m.
Saturday, August 27 — 2-4 p.m.

Round trip bus transportation to Museum and Annex available Wednesday evening.



PARTIAL PROGRAM LISTING

(Complete listing to appear in July issue.)

THEME: WESTERN ELECTRIC

AWA MEMBERS' FORUM

Discussion of activities led by President Geoff Bourne

KEY AND TELEGRAPH SEMINAR

Moderated by Tom Perera

MOONLIGHT RESTORATION FORUM

Hosted by Marc Ellis

SHORT WAVE REPORT

Bart Lee

REVIEW OF AMATEUR OPERATION

John Rollins, W1FPZ

PRE-1912 WIRELESS AND ELECTRICAL APPARATUS

Discussion and Display of Early Devices

Moderated by Lauren Peckham

BODY-WORN DIRECTION FINDING RECEIVERS AND A NEWLY DISCOVERED RUSSIAN ENIGMA CIPHER MACHINE

Tom Perera

HISTORY OF THE WESTERN ELECTRIC COMPANY

AN OVERVIEW OF TELEVISION HISTORY

Among the many other activities in store for you are the outdoor flea market, indoor book fair, ladies' luncheon, old equipment contest, annual sightseeing excursion, bus trip to AWA museum and annex. We plan a vacuum tube and main auction to include broadcast receivers, amateur equipment and more! The awards banquet will be on Friday evening and the Finale Luncheon Saturday at noon.

**COMPLETE CONFERENCE SCHEDULE AND REGISTRATION MATERIAL
WILL BE INCLUDED IN OUR JULY ISSUE.**

— See next page for Old Equipment Contest categories —

THE OLD EQUIPMENT CONTEST 2005 AWA CONFERENCE

THEME: WESTERN ELECTRIC

THE THEME CATEGORIES

1. TUBES

Western Electric was an innovator in the development and manufacturing of vacuum tubes. So bring in a fine example of W.E. tube history.

2. SPEAKERS

Western Electric made many fine examples of both cone and horn speakers.

- A. HORN
- B. CONE

3. RADIOS and AMPLIFIERS

This is the category to enter a model 2A, 2C, 3B, 4A, 4b or any other appropriate W.E. gear.

4. BROADCAST EQUIPMENT

W.E. had a rich history in the broadcast business. They produced transmitters, Microphones, Turntables, Tone arms, Studio control boards, Station monitoring equipment... What do you have to show us?

5. COMPANY HISTORY

Enter catalogs, Literature, Manuals, Advertising, etc.

6. RELATED COMPANIES

Many other companies were related to W.E., such as Northern Electric and GrayBar. Bring in an example of equipment from these companies with supporting documentation.

7. OPEN CATEGORY

W.E., of course, was a premier manufacturer of telephone gear as well as so many other things, such as fans, motors and who knows what else. Surprise us with something unusual!

THE STANDARD RECEIVER CATEGORIES

8. PASSIVE RECEIVERS

Any detecting device, not including vacuum tubes or solid state amplifying devices, whose purpose

is to convert radio energy into intelligent signals.

9. 1920S SUPERHET RECEIVERS

Any receiver which employs the superheterodyne circuit and is from the 1920s can be entered here.

10. 1920S TUNED RF RECEIVERS

During the 20s the TRF set was one of the most widely produced designs on the market. It was sold in kit form, factory assembled or built from scratch from magazine plans. This is where you would enter a Freshman Masterpiece, AK 20, or...

11. 1920S REGENERATIVE AND REFLEXED RECEIVERS

Many manufacturers employed different circuits to improve the receiving capabilities of their radios. The regen and reflex are a few of the many circuits that were used. Bring in a fine example of this type of radio.

12. CATHEDRALS, TOMBSTONES AND CONSOLES OF THE 1930s AND 1940s

These are probably the best known styles of antique radios. Just about everyone remembers someone in his or family owning one. So bring in that Philco 90 or any other cathedral, tombstone or console radio. We will split the category if enough entries show up.

13. RADIOS IN DISGUISE

Entries here can range from an end table radio to a lamp radio. There are many different styles and variations. Some fine examples would be a Porto bar radio, Melody Cruiser ship radio, or any radio made to look like something else.

14. PORTABLE RADIOS

Any battery-operated portable radio may be entered in this category. We may split the category into decades so a transistor set does not compete with a 1920s tube set. So bring in anything from an early portable radio of the twenties to a Zenith Transoceanic from the fifties or sixties.

15. SPEAKERS

A. HORN: Any sound reproduction device can be

entered here as long as it employs a horn or bell for sound amplification.

B. CONE: When radio sets obtained greater power output levels the magnetic speaker unit was designed with large surface areas for better sound reproduction. There are many fine examples of this type of speaker. i.e. Tower Adventurer, Western Electric...

16. TEST EQUIPMENT

Many people have asked that we include this category, and it has been part of the contest for the past several years. There were many makers of test gear. A short list would include Supreme, Superior, Hickok, Weston, Read-Rite, General Radio, Simpson, Rider, RCA, and too many others to list. So surprise us! Bring in the unusual or the common.

17. TUBES

In this category you can display a single tube or a collection. There should be a common theme with the display, such as historical significance, technological breakthrough, etc. The display should tell a story.

18. TELEVISION

A. MECHANICAL: Bring in a scanning disk or a mirror screw set. It can be original or a modern replica.

B. ELECTRONIC: Enter any non-mechanical television set. Can be black-and-white or color; kit- or factory-built.

THE AMATEUR RADIO CATEGORIES

19. SPARK TRANSMITTERS AND ARTIFACTS

Do not hesitate to enter a major piece of spark equipment if you think it is rare or historically significant.

20. VACUUM TUBE TRANSMITTERS AND RECEIVERS

Some of the sets for this class are old, some not so old; most are home-built. While the predominant entries have been amateur-operated, commercial equipment is also welcome.

THE CRAFTSMAN CATEGORIES

21. RESTORATION OF APPEARANCE

The purpose of this category is to display examples of rebuilding and refinishing the cabinets and containers that were used to house radio receivers.

THE CONTEST AWARDS

Elle Craftsman Given in memory of Bruce Elle to a builder of a high-quality radio receiver of an old or new type.

Matlack Transmitter Given for excellence in constructing or restoring transmitting equipment.

Ralph O. Williams Display Recognizes the informational value and quality of an exhibit in the contest at the AWA conference.

Thompson Best of Show Awarded in honor of early amateur Eunice Thompson, W1MPP, for the top entry in the Old Equipment Contest at the Annual Conference.

People's Choice Awarded to the entry that receives the most favorable votes from attendees and visitors to the contest. All entries including displays are eligible for this award.

There is no requirement for a particular kind or size of set to be entered. A description of the work done will be considered an important part of the entry. The critical element is the appearance of the radio, including woodwork, escutcheons, dials, knobs and other visual details.

22. RESTORATION OF OPERATION.

This is the category for those craftsmen who artfully substitute modern components for old failures. The new electrolytic in the old can is an excellent example. Another is the transistorized tube. Perhaps the replacement of pot-metal parts by silver-gray-colored epoxy castings has been accomplished by one of us. If so, please bring in the set that incorporates that restoration. Your entry should be accompanied by documentation showing how your update preserves the quality of the original.

23. NEW OR REBUILT.

Previously we have encouraged entries that showed the conference attendees how substitutions and reconstruction's would provide vital parts or pieces. We also encouraged craftsmen who had made an old function come alive again to bring their work for review.

Do you remember the Federal receiver and the operating Marconi coherer detector that were entered in previous contests? We want to continue that tradition so bring in your retrospective designs and reconstructions. There is no requirement for particular devices or circuits.

BREADBOARDING

EDITED BY **DICK PARKS**, 2620 LAKE RIDGE CT., OAKTON, VA 22124

E-MAIL: rparks9@cox.net. PLEASE INCLUDE SASE FOR REPLY.



*Bring Historical Circuits to Life
On Your Workbench!*

Building a Replica Magnetic Detector

By M. Daniel Merz • 312 Sierra St., Richland, WA 99354 • djmerz@3-cities.com

Introduction

After collecting and repairing radios for some time, I found myself exploring in the history of radio technology. I became interested in some of the very earliest equipment, most of which was all but impossible to acquire for study. Discovering an out-of-print book by Peter Jensen, *In Marconi's Footsteps—Early Radio*, I decided to follow the author's example by building a replica of Marconi's magnetic detector. This detector was patented in 1902 and used on ships and land stations from about 1904 into the teens.

In the Marconi detector, a thin iron rope is made to move within two concentric coils in a magnetic field. The field is

cause an audio signal to be picked up by the outer coil (which surrounds the inner one) and carried to the headphones. The detector has a spare and operational set of coils and magnets on its opposite side.

It is interesting that the moving rope causes a background rushing noise in the headphones with no signal. Moving a small magnet near the rope when it is stationary causes the same effect. With a radio signal going to the inner coil, artifacts of the derived audio are superimposed on this rushing sound.

Reportedly the Marconi detector was more sensitive than the "coherer" detector, which was the type used for the first transatlantic reception. It is known that the RMS Titanic had a magnetic detector on board at the time of its sinking.

The galena detector was more sensitive than the "maggie," as it was called.

However, it was considered more trouble to adjust and more easily jarred out of adjustment than the more ruggedly built "maggie." It was not unusual for radio rooms to have a few types of detectors on hand just in case.

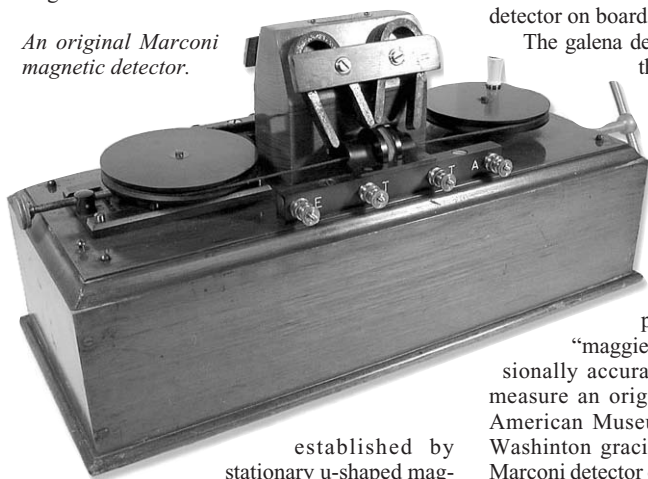
Though the Jensen book provided lots of details on the

"maggie," his replica was not dimensionally accurate. I needed to examine and measure an original unit. The curator at the American Museum of Radio in Bellingham, Washinton graciously gave me access to the Marconi detector on display in the museum's period radio room. With this information in hand, I proceeded to build two of these detectors, replicating the original as closely as I could.

Construction

The woodwork was easy to duplicate because of its simple design. Only basic shop tools were used in construction. I used mahogany veneer and solid Honduras mahogany for the box and magnet pedestal. The unit was finished with using wood filler, stain, and spray lacquer.

An original Marconi magnetic detector.



established by stationary u-shaped magnets, which have like poles adjacent. As the rope moves, each element of the iron rope is first magnetized in one direction as it enters the two coils and then the direction is reversed as it comes out the other side.

The inner coil, on the small glass tube surrounding the rope, is energized by the incoming radio signal. This causes the discrete magnetic domains to alter in bursts (this phenomenon was identified as "the Barkhausen effect" in the 1920s). The bursts of changing magnetization

The alignment of the wheels with the magnet pedestal and the coils on either side of the pedestal is critical. It must be arranged so that the wire rope runs true and through the center of each coil pair without dragging or binding. I used the close measurements I had made on the original and a computer drawing program to get everything correctly placed above and below the top deck.

The metal work for a slide mechanism where the wheels are mounted was made from brass stock using a hacksaw, metal files and drill press. The undriven wheel was supported using small ball bearings above the sliding member. The large wheels were cut from 1/2"-thick stock using a bandsaw, then trued with a router using a contrived pivot assembly on the router table.

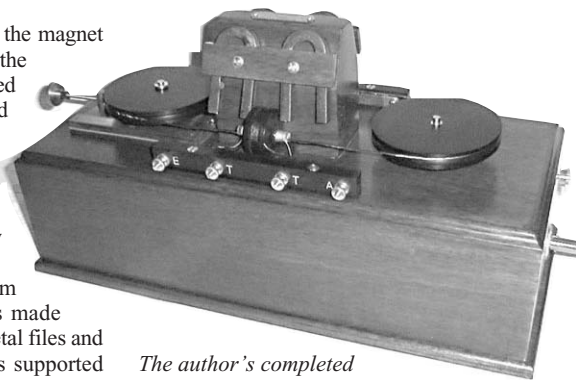
Cutting the grooves in the wheels was the only job requiring the use of a lathe, and that was done at a friend's workshop. The original detector used "ebonite," or hard rubber, for the two wheels and terminal bars. This was an excellent insulator and was readily available over a hundred years ago. Though this material is still available, it is quite expensive—so I settled on black Delrin, or Acetal. It has excellent electrical properties, is relative easy to fabricate, and looks much like the original material.

The original motor used to drive the iron wire on the pulleys was probably similar to a clock mechanism. I decided to use an old phonograph spring motor as the basis for my drive. When I had trouble finding a motor that would fit in the cabinet, a friend gave me one from his large collection. I later bought a duplicate of this motor on eBay for use in my second replica.

It was necessary to install speed reduction gear train, using parts purchased from a commercial supplier, to approach the seven rpm speed of the original. A winding handle, "on-off" knob and halting assembly were made to look and work like the originals.

An essential touch was the replica Marconi tag fastened to the top of the magnet pedestal. A local engraver did the deep engraving required and I cut the tag out to match the original shape. The serial numbers used were sequential numbers above the one on the original I had examined. From photographs of various Marconi instruments, I surmise that the same tags were used on the firm's other equipment, the only difference being the particular serial number used. Perhaps someone knows whether the numbers were coded in some manner according to instrument type.

I had originally purchased four horseshoe magnets of approximately the correct size, but



The author's completed replica.

later opted to more closely duplicate the shape and size of the original magnets by fabricating "dummies" out of hot-rolled low-carbon iron. These give the detector a more authentic appearance. I was able to purchase small 3/8-inch cubical neodymium permanent magnets to attach to the ends of the dummies to provide the needed magnetic field.

Later experiments showed that these constructions worked just as well as the U-shaped magnets first purchased. It's interesting that the purchased magnets were made in Sheffield, England, possibly near the original source that Marconi used. The 6% tungsten composition used for these permanent magnets was known in Marconi's time.

Fabricating the Rope

The wire for the moving rope was the most difficult item to obtain. Reportedly, the original detector used 70 strands of 40 BSW gage (about 5-mil diameter) silk-covered soft iron wire. I was able to locate just one source for soft iron wire as fine as this—through a supplier of harpsicord strings for early instruments. However, the cost seemed high and it was uncovered wire.

I decided to settle for 8 mil soft iron wire, which was available from with a U.S. supplier. For \$20.00, I obtained enough wire for all the experimentation I might have to do. Jensen had also compromised by using wire that was not as fine as the original. And he insulated the wire using varnish, a somewhat tedious task. I decided to use 50 strands of 8 mil wire rather than 70, which even at that gave a somewhat larger cross-section of iron compared to the original.

There might have been a couple of reasons for using fine wire: (1) to make the rope flexible enough to move easily around the wheels and (2) to improve the magnetic behavior in some way. So far, I've found no answers in the literature.

I racked my brain for reasons why the wire

had to be silk wrapped. Perhaps it was done to reduce losses through eddy currents, thus enhancing either the efficiency with which radio frequencies could effect magnetic domain changes or the efficiency with which domain changes are converted to audio energy. Or perhaps the covering improved the long term performance of the rope by making it more flexible or easier to replace. Whatever the reason for the silk covering, it is likely that Marconi arrived at this choice by experimentation rather than by design.

I opted to build my first rope without any insulation between the strands for the rope and see if it worked. Of course, the rope ends had to be joined after being threaded through the two sets of coils, which is not an easy job. The individual wire ends were not spliced electrically, but twisted together. These join points were staggered so that they would not form a large bulge. The entire joint area was then overwound with one strand of the fine iron wire.

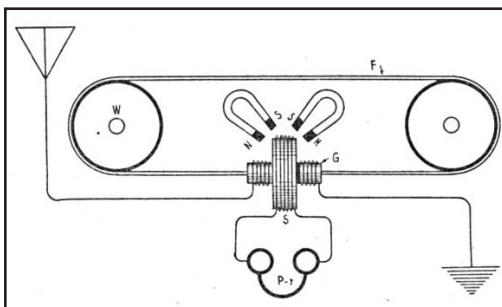
Results

I was very pleased to find that my replica worked, though I have no basis for comparing my results to the original at this time. The instrument will demodulate amplitude-modulated r.f. signals fed into it. I was actually able to listen to music with the device—even though I was pre-disposed to think that only highly damped spark signals would trigger it. However, I have not tested this device with sufficiently weak signals to say that it would be as useful as an original Marconi detector.

I tested the detector two ways: first I hooked the i.f. output of my Collins R-388 receiver (500 kHz) to the A and E (antenna and ground) connections of the detector, having first pulled out the detector, avc, and first audio tubes of the receiver to be sure no demodulated i.f. was getting back and fooling me. (I did have a problem with this effect in my initial tests.) This convinced me that the detector was actually demodulating a.m. signals.

I then attached the detector to my signal generator and sent in a low frequency signal, between 250 to 660 khz, that was modulated with 400 or 1000 hz audio. I tried both a direct hookup and one made through a 0.01 uF cap to the A and E connections. I was able to demodulate the signal under all these conditions, but response decreased if I went above this range and into the shortwave region.

Using either the R-388 or the signal generator as a source, I heard audio in the headphones only when the rope was moving (a good thing!) or



Pictorial diagram showing relationship of parts in Marconi detector.

when a magnet was moved near the coil with the rope stationary. I needed a generator attenuator position corresponding to about 4000 microvolts of signal to get any result—suggesting nor very high sensitivity. But I haven't experimented with impedance matching yet.

A Simple Working Model

A working model of this detector could be built very easily if one does not try to duplicate the original appearance. I think braided picture wire would work for the rope (soft iron is desirable because it is easily demagnetized). The coils should be wound on concentric forms. A 3/8"-diameter ball-point pen body would work for the inner form and a surrounding sewing-thread spool or other small bobbin for the audio coil. The diameter of the spool hole should be as small as possible so that the two coils are as close as possible.

Wind about 120 turns on the inner (r.f.) coil and about 2500 turns on the outer (audio) coil. I used #40 wire and #34 enameled copper wire, respectively. Of course, only one pair of coils is needed. Any two magnets will probably be adequate. Use any motor arrangement that will drive the rope at about 3 inches/second (not critical). If an electric motor is used instead of a spring motor, make sure it is quiet enough to allow you to hear the detected signal.

The A and E connections are for aerial and earth (ground) but, after about 1907, were generally connected to the output of a tuner like the Marconi Multiple Tuner. I've never used such a circuit, tried the detector using any type of tuner, or picked up actual signals from an antenna. ☼

ACKNOWLEDGEMENTS

I would like to thank Peter Jensen for answering some of my questions regarding the detector he built and helping me find a copy of his book,

RADIO REPRODUCERS

EDITED BY **DAVE CROCKER**, 35 SANTUIT POND RD., #4B, MASHPEE, MA 02649
PLEASE INCLUDE SASE FOR REPLY.

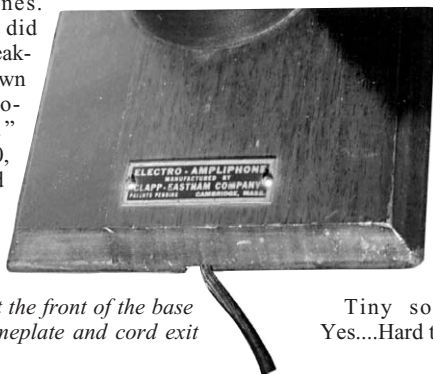


The Clapp-Eastham Electro-Ampliphone

The history of the Clapp-Eastham Company goes back to 1908, when the firm began to manufacture wireless components in Cambridge, Massachusetts. I used to pass right by the brick Clapp-Eastham building every day while commuting, and I would always wonder if there was still anything left in the attic. The building has undergone many changes since then.

The company began to sell radio components during the teens, and was marketing complete receivers by 1920. During this period, it produced such well-known models as the Blitzen, HR, R4 and Radak. Clapp-Eastham's short life ended in 1927, with its sell-out to the Emerson Radio Company.

Bob Sukosky, the Connecticut headphone collector, doubts that the company ever produced or sold headphones. However, they did produce one speaker: the little known "Radak Electro-Ampliphone." Priced at \$28.00, it was advertised as the perfect companion to the Radak RZ



Here's a peek at the front of the base showing the nameplate and cord exit location.

receiver.

This straight-neck horn speaker is of understated, no nonsense design. It had no sound chambers, graceful curves or pretty colors; there was a laboratory look about it.

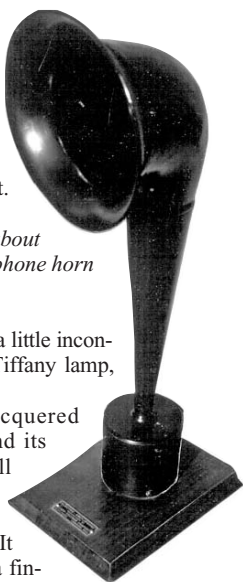
There was nothing fancy about the Radak Electro-Ampliphone horn speaker.

The unit might have look a little incongruous next to a period Tiffany lamp, but it did the job.

The glossy, black-lacquered brass horn is 20" tall and its

rather small bell opening is just 7" across. It stands on a finished $\frac{3}{4}$ " mahogany base that measures $5\frac{3}{4}$ " by $7\frac{3}{4}$ ". The reproducer cord exits the front of this base just below the brass nameplate. The advertising assured the prospective buyer that it would not distort the tone.

Tiny sound? Yes....Spartan looking? Yes....Hard to find? Yes!



which is out of print. The book was an excellent resource and still provides additional insights every time I browse it. At the time of my inquiry he still had a few copies on hand in Australia. For more information, visit the "www.valve...." web site listed in "References."

I would like to thank John Jenkins of the American Museum of Radio in Bellingham, WA for information he provided about the detectors he has and Jonathan Winters of the same institution for letting me closely examine the Marconi

detector at the museum.

Thanks also to John Reed of Union, OR for bending the "dummy" magnets for me.

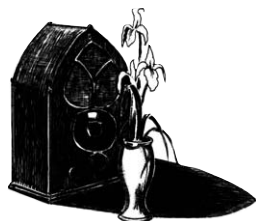
REFERENCES

<http://home.luna.nl/~arjan-muil/radio/history/history-frame.html>
http://www.midnightscience.com/_web/0000041c.htm
<http://www.valve.demon.co.uk/Books/earlyrad.htm>

RECENT RADIO, TV AND ENTERTAINER OBITUARIES

COMPILED BY **CHARLES S. GRIFFEN WIGYR**

1225 NEW BRITAIN AVE., WEST HARTFORD, CT 06110-2405



Note: When known, the date of death is indicated in parenthesis.

WALTER L. "SALTY" BRINE, 86, (11-4-04) radio & television personality. Brine was the host of the morning program on WPRO(AM) in Providence, RI from 1942 until 1993. He also created a children's television show, called *Salty Brine's Shack*, which he hosted on Channel 12 from 1958 to 1968. Much of his success was attributed to his charisma and ability to connect with his listeners on a one-to-one basis. On his final radio broadcast he told his audience, "I think I've lived through four generations." Brine began his career at WHDH(AM) in Boston.

JOE BUSKIN, 87, (11-3-04) jazz pianist and composer. Bushkin was "a swing-era pianist with a spirited style" who recorded and performed with many jazz legends including Bunny Berigan, Fats Waller, Eddie Condon and Billie Holiday. He began his professional career in 1932 with the Frank LaMarr Band. In 1940 Buskin joined the Tommy Dorsey Band and co-wrote the hit "Oh! Look at Me Now" with John DeVries. The song helped launch the career of Frank Sinatra, the band's vocalist. He left Dorsey in 1942 to play trumpet in the U.S. Army band. After the war he worked with Benny Goodman and Louis Armstrong. During the 1950s he played at the Embers, a Manhattan jazz club, and led his own bands through the 1950s and 1960s. Buskin was semi-retired from 1971 to 1975 but went back on the road to accompany Bing Crosby on his last tour of the United States and Europe in 1976 and 1977.

HILDA PARKS COHEN, 78, (10-7-04) producer, writer and actress. Cohen scripted the first twenty Tony Award telecasts (1967-1986) which were produced by her late husband, Alexander H. Cohen. She won Emmy Awards in 1980 and 1982 respectively for producing the 34th annual Tony Awards and *The Night of 100 Stars*. Cohen also wrote the 37th and 38th annual Emmy Awards; *Placido Domingo: Steppin Out With the Ladies* (ABC 1985) and NBC's 60th anniversary show (1986). She began her acting debut on Broadway in *Bathsheba* in 1947 which starred James Mason and Gloria Swanson. A year later she played the Girl in Tennessee

William's *Summer and Smoke* and was the only woman in the London cast of *Mr. Roberts*. Some of her film credits include *Fail Safe* (1964) and *The Group* (1966). Cohen also appeared on many television programs including *Love of Life* (CBS 1951-1955), *Down You Go* (NBC 1956), *Studio One* (CBS), *To Tell the Truth* (CBS 1956-1957) and *The Philco TV Playhouse* (NBC).

CY COLEMAN, 75, (11-18-04) jazz pianist and composer. Coleman was "renowned as one of today's most versatile and influential music creators." He wrote or co-wrote the music for many Broadway shows including *Barnum*, *Sweet Charity*, *On the Twentieth Century*, *City of Angels* and *The Will Rogers Follies*. These last three shows each won Tony Awards. With lyricist Carolyn Leigh they produced such enduring songs as *Hey Look Me Over*, *Witchcraft* and *The Best is Yet to Come*. Some of his film scores include *Father Goose*, *The Art of Love*, *Garbo Talks* and *Family Business*. Coleman's television credits include the following: *Starlit Time* with the Cy Coleman Trio (Dumont 1950), *ABC's Nightline* with the Cy Coleman Orchestra (ABC 1965), conceiving and writing the 1974 special *Shirley MacLaine: If They Could See Me Now* (CBS) and producing her 1976 special *Gypsy in My Soul* (CBS). The last two shows earned him three Emmy Awards. Coleman was inducted into the Songwriters' Hall of Fame in 1981.

RODNEY DANGERFIELD, 82, (10-5-04) comedian. Dangerfield, whose catch phrase was "I don't get no respect," performed in night clubs, films, and television and made recordings. He starred in more than six HBO comedy specials and appeared on *The Tonight Show* (NBC) more than 70 times. Some of his other TV credits include *The Dean Martin Show* (NBC 1972-1973), *Mad TV* (FOX) and *On Broadway Tonight* (CBS). Dangerfield's first film appearance was in *The Projectionist* (1971) followed by *Caddyshack* (1980), *Easy Money* (1983), *Back to School* (1986) and a rare dramatic part in *Natural Born Killers* (1994). His first comedy album, *No Respect*, won a Grammy Award in 1981. He began his career as a stand-up comic but became discouraged and quit in the early

1950s. At 44, after operating an aluminum siding business, he auditioned for a spot on *The Ed Sullivan Show* and was accepted. After that his popularity grew rapidly.

SKETER DAVIS, 72, (9-19-04) country singer. Davis was a member of the *Grand Ole Opry* radio program from 1959 until last year and became an international star with her 1963 hit recording *The End of the World*. Other Top 10 hits include *Set Him Free* (1957), (*I Can't Help You*) *I'm Falling Too* (1960) and *My Last Date (With You)* (1961). With her high school friend Betty Jack Davis they became the Davis Sisters singing in the Lexington, KY area in the late 1940s followed by radio and television appearances in Cincinnati, OH and Wheeling, WV. In 1953 they signed a contract with RCA where they recorded their first hit; *I Forgot More Than You'll Ever Know*. After a car accident killed her singing partner she began a solo career which included concert dates in the U.S., Canada, Europe and the Far East. She also toured with Elvis Presley and the Rolling Stones.

HUNTER HANCOCK, 88, (8-4-04) radio personality. Hancock is credited with being the first disc jockey in the western United States to play rhythm and blues and one of the first to broadcast rock 'n' roll. In 1943 his first show, *Harlem Holiday*, began on KFVD(AM), later KPOP(AM), in Los Angeles. It aired for an hour on Sundays, but in 1947 it became *Harlematinee* and was heard daily for an hour. Eventually it became so popular it was expanded to 3½ hours Monday through Saturday. In 1956, after the station signed off the air, Hunter began a nightly Top 20 show, *Huntin' With Hunter*, for KGFI(AM) from 9 to 11:30 p.m. In 1957 he hosted a ½-hour Sunday gospel show on KGER(AM) called *Songs of Soul and Spirit*. He also hosted live talent shows at black clubs and did a series of shows at the Olympic Auditorium and the Orpheum Theatre. Many black and white audiences were surprised to discover Hunter was white. He began his career at KMAC(AM) in San Antonio.

JEAN HAY, 87, (9-18-04) radio personality. Hay was host of *Reveille With Beverly* which provided millions of American troops during WWII with an alternative to the 5:30 a.m. bugler's blast. Hay as the effervescent Beverly played records, took requests and read fan mail on KNX(AM) in Hollywood from 1941 to 1944. The program was also aired on the Armed Forces Radio Services which later hired her to do a similar show, *GI Jive*, to boost troop morale. The programs in time reached an audience estimated at 11 million in 54 countries, making her

one of the first international disc jockeys. Hay's first *Reveille With Beverly* aired on KFEL(AM) in Denver on October 20, 1941. She conceived of the program's format while a college student in Colorado. Later feature stories about her program in two national magazines resulted in an offer from KNX to transfer the show to Hollywood.

PETE JOLLY, 72, (11-6-04) jazz pianist, composer and accordionist. Jolly, an improvisational keyboardist, performed at Southern California jazz clubs. He also did studio work and provided the theme music on the television programs *Get Smart*, *The Love Boat*, *I Spy*, *Mannix*, *Dallas* and *M*A*S*H*. Studio dates kept Jolly busy from the mid-1960s until the mid-1980s, when the arrival of synthesizers made him decide to return to performing in public. The Pete Jolly Trio performed in local clubs from 1964 until his hospitalization last August. His composition "Little Bird" was nominated for a Grammy Award in 1963. Jolly, who began his career playing with local groups while in high school, moved to Los Angeles in 1954 to perform with Barney Kessel, the Shorty Rogers Giants (1954-1956) and the Buddy De Franco Quintet (1956).

HOWARD KEEL, 85, (11-7-04) actor and singer. Keel, who was ruggedly handsome and possessed a rich baritone voice, performed on the Broadway and London stages, appeared in over 30 movies, and later enjoyed a success on television. He starred in such film musicals as *Show Boat* (1951), *Lovely to Look At* (1952) and *Kiss Me Kate* (1953) all with Kathryn Grayson, *Calamity Jane* (1953) with Doris Day, *Rose Marie* (1954) with Ann Blyth, and probably his best-known film *Seven Brides for Seven Brothers* (1954) with Jane Powell. In 1946 Keel was hired by Oscar Hammerstein II to appear in the Broadway production of *Carousel*. A year later he played the lead role in the London opening of *Oklahoma!* He remained there for 18 months before signing a film contract with MGM. Keel played the role of Clayton Farlow on the television drama *Dallas* (CBS) from 1981 to 1991. During WWII Keel worked for the Douglas Aircraft Company where his singing talent was put to use touring their plants to boost morale.

LESTER LANIN, 97, (10-27-04) society bandleader. Lanin provided "two-beat dance tempo" music in the grand ballrooms of the Vanderbilts and Rockefellerers and for such events as Queen Elizabeth's 60th birthday party and Prince Charles and Lady Diana Spencer's wedding. Lanin also played at every presidential inauguration from Dwight D. Eisenhower to Bill

Clinton and for the kings of Norway, Sweden, Spain, Greece and Denmark. By 1992 Lanin and his bands, sometimes as many as twelve on the road at once, had played for 20,000 wedding receptions, 7,500 parties and 4,500 proms. At the time of death there were only two bands remaining and Lanin had put down his baton three years ago. He was inducted into the Big Band Hall of Fame in 1993. Lanin dropped out of school at 15 to play with his brothers' bands and book musicians for them and himself. He got his big break in 1930 when he played at the New York City coming-out party for the Woolworth heiress Barbara Hutton.

JANET LEIGH, 77, (10-3-04) actress. Leigh will always be remembered for her role in Alfred Hitchcock's *Psycho* (1960) film where she is stabbed to death in the shower scene. The performance established her as a star and earned her a Golden Globe and an Academy Award nomination. Some of Leigh's more than 60 motion pictures credits include *Little Women* (1949) starring Elizabeth Taylor, *Pete Kelly's Blues*, *My Sister Eileen* (1955), *Touch of Evil* (1958) with Charlton Heston and *The Manchurian Candidate* (1962) starring Frank Sinatra and Laurence Harvey. With Tony Curtis, to whom she was married from 1951 to 1962, they made five films together: *Houdini*, *The Black Shield of Falworth*, *The Perfect Furlough*, *Who Was that Lady?* and *The Vikings*. Leigh's last film was *A Fate Totally Worse Than Death* in 2000. Leigh made her television debut on *The Rosemary Clooney Show* in 1956 and made multiple guest appearances on the *Bob Hope Presents the Chrysler Theatre* (NBC), *Fantasy Island* (ABC), *The Love Boat* (ABC), *Rowan & Martin's Laugh-In* (NBC) and *What's My Line* (CBS).

ROBERT MERRILL, 87, (10-23-04) opera singer. Merrill was the leading baritone at the Metropolitan Opera in New York City where he appeared 787 times in twenty roles from his debut in 1945 until 1975. He retired from the Met in 1976 but returned to take part in their centennial celebration in 1983. Merrill's operatic ambitions were helped when he sang on *Metropolitan Opera Auditions* in 1945 (NBC Blue Network.) The appearance changed the direction of his life and career. He was the youngest baritone to sing the part of Germont at the Met and his rendition made him an operatic star. Many of Merrill's roles have been recorded including his 1950 duet with Jussi Bjorling of Bizet's "The Pearl Fisher" which became an all-time classical music best seller. He was heard on many radio programs including *The Chicago Theater of the Air* (Mutual), *The RCA Victor Show* (NBC 1945-

1949), *Encore* (NBC 1952-1953), *An Evening with Romberg* (NBC 1945-1948), *The Metropolitan Opera* (Major networks and a special network of 300 stations) and *The Robert Merrill Show* (NBC 1945-1946). Television credits include appearances on *Opera vs. Jazz* (ABC 1953) and *Your Show of Shows* (NBC 1950-1951). In 1993 President Bill Clinton awarded him the National Medal of Arts.

ANCIL PAYNE, 83, (10-2-04) broadcast executive. Payne was Chairman and Chief Executive Officer of KING Broadcasting Company from 1971 until his retirement in 1987. Under his leadership he helped build the firm into a \$400-million broadcasting and cable conglomerate. With no broadcast experience he was hired as an Assistant to the Vice President, Business Division at KING(TV) in 1959. The station, owned by Dorothy Bullitt, was the Pacific Northwest's first television station and would become known nationally for its commitment to ethical journalism. Payne was named Vice President and General Manager of KGW in Portland in 1965 and five years later he returned to Seattle to become KING's Chief Operating Officer. Payne, a U.S. Navy veteran of WWII, was Chairman of the National Broadcasting Company Board of Affiliates during the late 1980s.

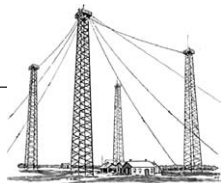
JOHN PEEL, 65, (10-25-04) radio personality. Peel was the host of a late night program on BBC's Radio 1 where he exposed British listeners to new forms of music—punk rock, reggae and hip-hop—and provided air time for new bands to gain recognition. He joined Radio 1 in 1967 when it began and remained there for the next 37 years. Peel also hosted *Home Truths*, a popular Saturday morning show, on Radio 4. Prior to joining Radio 1 he worked for Radio London, an offshore pirate station. Peel began his broadcasting career at WRR(AM) in Dallas in 1962 and worked at a number of major market stations before returning to Britain. He was awarded an Order of the British Empire in 1998 and was voted *Melody Maker's* DJ of the year eleven times.

PEGGY RYAN, 80, (10-30-04) dancer and actress. Ryan tap-danced from Hollywood soundstages to Las Vegas showrooms during a career that lasted more than three-quarters of a century. Of her 30 film credits she is probably best remembered for the fourteen musicals made with tap-dancing partner Donald O'Connor. Some of these included *Private Buckaroo* (1942), *When Johnny Comes Marching Home* (1942), *Mister Big* (1943), *Chip Off the Old Block* (1944) and *Bowery to Broadway* (1944).
(continued on page 31)

BELOW 535

EDITED BY **FRANK LOTITO, K3DZ**, 1428 O'BLOCK RD., PITTSBURGH, PA 15239

PLEASE INCLUDE SASE FOR REPLY.



Let the Heavens Speak—An Introduction to Natural Radio

Part 2 (conclusion)—Receiving Natural Radio Signals

An article about receiving natural radio signals? You might think I'm kidding. If you've invested in a state of the art receiver with all the bells and whistles known to man, why would you want to listen to "noise?" But the sounds of natural radio are associated with the creation of the universe and the forces within the heavenly bodies of the cosmos. There is a small army of dedicated scientists, students and hobbyists listening to and analyzing these natural electromagnetic emissions in an attempt to explain the relationships between the different forces of nature. Our understanding of these emissions is slight, but slowly improving.

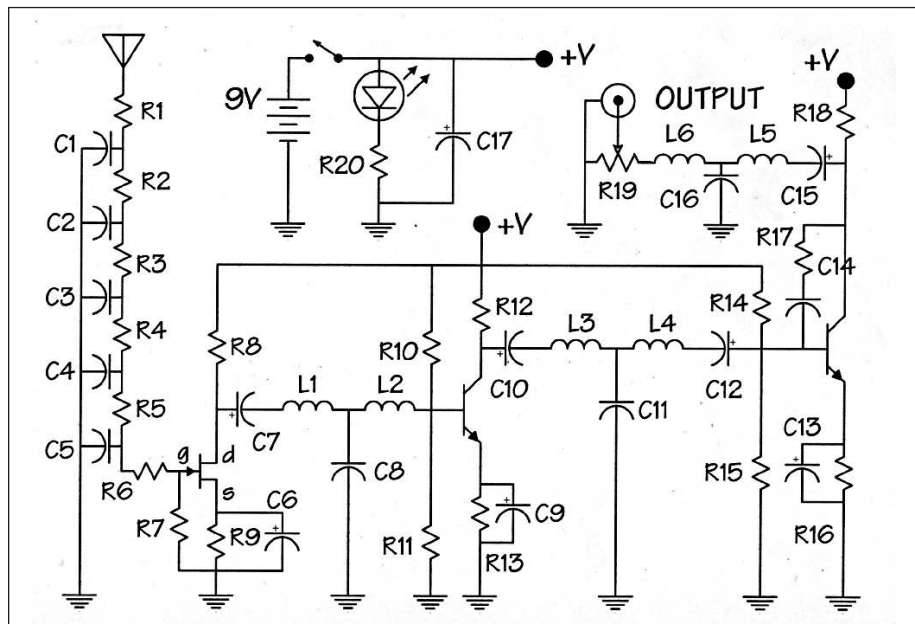
Just how do we receive natural radio emissions? One could start with a standard communications receiver covering LF through HF. A simple antenna, be it dipole, end fed, or vertical will work. Antenna tuning is not necessary to re-

ceive atmospheric-related emissions because those emissions are very strong—especially if caused by a nearby storm.

Of course the usual precautions regarding the use of receiving equipment during nearby electric storms should be observed. If listening to those becomes a major interest, consider using battery-powered equipment (to avoid connection to the AC line) and indoor antennas.

The natural radio emissions whose frequencies are in the range of human audibility (50 hertz to a few kilohertz, and for some individuals as high as 18 kHz)¹, can be received using nothing more than an audio amplifier connected to a vertical antenna²! What you hear will be a function of a few major factors:

1. First and obvious, the receiving location's distance from power lines, power distribution substations, and "noisy" users of AC power



The Larry Kramer Team 19 VLF2000 Receiver.

sources, such as electric welding. The serious natural radio hobbyist/academic investigator locates his equipment in remote areas in an attempt to find an electrically quiet receiving location.

2. The observer's range of audibility and the distribution of energy produced by the event(s) being monitored.

3. The effectiveness of the receiver's ground and the length of the vertical antenna, if using an "E-field" antenna.

4. The amplifier design. A battery-powered solid-state system of very sturdy mechanical construction and using low-noise components and circuit design is a must for optimum performance. The design should incorporate inter- and intra-stage shielding and interstage power-supply decoupling. Ground loops should be avoided.

I'm including a schematic and parts list for an easy-to-build audio-range, natural radio receiver. To many of us "receiver" means a heterodyne, TRF, regen, direct conversion, TV, or SSB design. However, in more basic terms, a receiver is a "transducer" that converts electromagnetic energy into a domain that we can hear, see, or further process using additional electronic/computer devices. Larry Kramer's VLF 2000 Team 19 receiver, presented here, is such a transducer.

In this receiver design the entire signal processing scheme (antenna interception of the electro-magnetic energy, the current flow from the antenna, signal amplification and bandpass limiting) takes place at the mind-boggling frequency range of a few hundred Hz to a few kilohertz. A detector stage is not necessary because we can directly hear the signal that has been transformed from the electro-magnetic domain to the electron current domain, and finally to the electron current flow that powers our loud speaker or earphones.

This receiver is suitable to receive sferics, tweeks, whistlers and choruses. The hobbyist will usually record such sounds using a battery-powered solid-state audio tape recorder or a laptop computer³. A 9-volt integrated circuit audio amplifier designed for transistor radio use (the LM386 (Radio Shack RS276-1713) amp can be connected to the receiver's output to drive earphones or a 4 to 16 ohm speaker. For simple audio amplifier circuits using the LM386, see the Radio Shack (Archer) Semiconductor Reference Guide, the Radio Shack packaging for the device, or browse "Google."

Receiving infrasonic or ultra-low-frequency signals requires more specialized equipment and signal analysis techniques. "H-Field" antennas (shielded receiving loops usually employing ferrite loading), data loggers (either stand-alone or more recently the laptop PC), digital signal analy-

sis software, and playback techniques that speed up the recorded and processed signal such that we can hear or see a few cycles of the signal on a computer screen. Since humans can not hear these low frequencies, this playback technique (the audio version of time lapse photography) must be used.

Natural radio hobbyists, students and academicians associated with NASA occasionally join forces to investigate specific phenomena. Exam-

VLF2000 RECEIVER PARTS LIST

Resistors (all 1/4-watt)

R1, R6	18k
R2, R5	36k
R3, R4	56k
R7	2.0 meg
R8	1.5k
R9	560
R10, R14	3.3k
R11, R12, R15, R18	10k
R13, R16, R20	4.7k
R17	100k
R19	10k low-noise audio potentiometer

Electrolytic Capacitors (12 vdc or higher)

C6	10 µf
C7, C10, C12, C13, C1	51 µf
C9	4.7 µf
C17	100 µf

Non-Polarized Capacitors (12 vdc or higher)

C1, C5	39 pf mica
C2, C4	75 pf mica
C3	130 pf mica
C8	0.044 µf foil or ceramic
C11	0.022 µf foil or ceramic
C14	0.0039 µf foil or ceramic
C16	0.0056 µf foil or ceramic

Inductors (values in millihenries)

For these items, check Mouser Electronics or the Web sites for Fastron, Xicon, and R.J. Miller

L1, L2	36
L3, L4, L5, L6	22

Semiconductors

The FET: 2N3819, NTE312 or RS276-2035

The transistors:

2N3904, NTE123AP or RS276-2009

The LED 2mA low-current type

*In general, electrolytics have poor mid and high audio frequency impedance. It may be advisable to parallel a 0.05 µf ceramic across each 1 µf electrolytic and a 0.1 µf plus a 1.0 µf mylar across each of the larger value electrolytics.

ples might be the emissions caused by a rocket as it punches its way through the different layers of the atmosphere and the effects of solar eclipse and meteor showers on natural radio emissions.

You may want to explore the reception of natural radio signals on the internet. Here are some web sites that will give you a good start:

- The Longwave Club of America, <http://www.lwca.org>
 - Altair Natural Radio Projects, <http://www.altair.org>
 - Web and magazine publications of well known natural radio hobbyists such as Mark Karney, N9JWF
 - The Natural Geophysical Data Center site, <http://www.ngdc.noaa.gov/ngdc.html>
 - The Yahoo VLF Natural Radio Group http://groups.yahoo.com/group/VLF_Group/
 - The Inspire Team site (a group of school-aged, amateur and academic investigators under the leadership of NASA, <http://home.pon.net/785/>, and <http://image.gsfc.nasa.gov/poetry/inspire/index.html>)
 - The “ultra and extreme low frequency” web site, <http://www.elfrad.com/>
 - Larry Kramer’s web site for Inspire and Team 19 Natural Radio, <http://home.pon.net/785>
 - The Music of the Magnetosphere and Space Weather, <http://www.auroralchorous.com>
 - Stephen P. McGreevy’s ground-based ELF-VLF recordings, <http://www-pw.physics.uiowa.edu/mcgreevy/>
- Have fun, and remember, when the heavens

speak loud enough for you to hear them without a radio receiver, it is definitely best to immediately get those earphones off of your head, disconnect your receiver from your outside antenna, and ground the antenna. Otherwise you may hear that ultimate heavenly sound: Saint Peter calling your number!



FOOTNOTES

- ¹ The range of human audibility is a function of age, disease, certain drugs, traumatic injury to the auditory mechanism, and the extent of continuous high intensity noise exposure during the person’s lifetime.
- ² I have read and heard of instances where high gain audio equipment has “envelope detected” search radar pulses, AM broadcast radio, and “standard” TV broadcast transmissions. Most definitely, a battery-powered oscilloscope is a desirable adjunct to an audio pass band receiver system, or for that matter, any high gain receiver system were overload or unexpected results may be encountered.
- ³ For years laptop (and desk top computers) have been commonly available with a means to digitize an analog audio input signal, and record the digitized audio in one or more of the more popular digital audio formats, e.g., WAV, MP-3, CDA, etc. The common PC can also run software that allows the PC to easily work as an audio range oscilloscope and audio spectrum analyzer.

OBITUARIES, continued from page 28

Her final musical was *All Ashore* (1953) starring Mickey Rooney. She played the role of Jenny Sherman on the television police drama *Hawaii Five-O* (CBS 1969-1976) and performed live on the 1948 television debut of Milton Berle’s *Texaco Star Theater* (NBC) and Ed Sullivan’s *Talk of the Town* (CBS). Ryan, whose vaudevillian parents were the Dancing Ryans, made her dancing debut at 2 years, 9 months.

ADAM YOUNG, 91, (11-15-04) broadcast executive. Young was the co-founder, Treasurer and a Director of Young Broadcasting Inc. The New York City-based firm owns and operates eleven television stations mostly in small markets with the exception of KRON in San Francisco. KRON(TV) is the nation’s largest independent station. The firm was founded by Young and his son, Vincent, in 1986. Young also established Adam Young Inc. in 1944 which represented radio stations and later focused on television out-

lets. He began working as a page at NBC when he was 17 and later moved to their Radio Programming and Research and Promotion Departments. Young left NBC in 1936 to work in advertising.

Information for this column was obtained from *The Big Bands* (4th ed.), *The Complete Directory to Prime Time Network and Cable TV Shows 1946 - Present* (20th edition), *The Encyclopedia of Jazz*, *The Hartford Courant*, *On the Air: The Encyclopedia of Old-Time Radio*, www.ascap.com, www.bbc.co.uk, www.boston.com, www.cgi.tennessee.com, www.electricearl.com/dws/hunter, www.guardian.co.uk, www.ieeeorg, www.imdb.com, www.jcomm.uoregon.edu, www.king5.com, www.latimes.com, www.newsvote.bbc.co.uk, www.nytimes.com, www.projo.com, www.reviewjournal.com, www.seattletimes.com, www.nwsourc.com, www.takecountryback.com, www.timesonline.co.uk and www.youngbroadcasting.com.

Thanks to Dr. David A. Wunsch for additional source material.



THE BEGINNINGS OF RADIO CENTRAL



This article was one of a series by the authors about RCA's "Radio Central" operations at Riverhead and Rocky Point New York. The series was published in the Spring, 1992 issue (Vol. 20, No. 1) of The Antique Radio Gazette. One part of the series, The Alexanderson Alternator Story, was published in our last issue. Additional parts will be published in future issues. Some editing has been done, but the content remains unchanged.

The beginnings of Radio Central, the extensive facility of the Radio Corporation of America (RCA) on the eastern end of Long Island's north shore, is a fascinating story. Most radio historians are familiar with some of this information. But the details are known only to those who have searched them out in contemporary records and verified their findings with the people who were assigned there. The story is well worth recording and telling, if only because of the impact that Radio Central had on the world of electrical communications.

One way to start is to look at the functions performed at the facilities at Riverhead and Rocky Point. They included high speed radio telegraphy, antenna experiments, propagation studies, and transmitter development. Those beginnings are recounted in other articles by the authors.

Another place to start is with the corporate parentage of Radio Central. That part of the story is told in this article, which traces the path beginning with the work of Marconi. Upon realizing the possibilities for two-way message exchange without the limitations of land-based pathways (wires), Marconi moved from his home country, Italy, where his work was not appreciated, to England, where his contributions to the art of communication were highly regarded. There he sought financing from his family and from others who could envision the possibilities of his ideas.

His goal was to develop a practical wireless (radio) signalling system. His ideas attracted enough attention for interested financiers to set up the Wireless Telegraph and Signal Company in 1897. Its purpose was to provide the financial backing Marconi needed to reach his goal. The inventor was made the chief engineer of the company.

For more effective fund raising (probably based on drawing power of Marconi's name) the name of the company was changed to "Marconi's Wireless Telegraph Company, Ltd." (Hereafter called British Marconi). Marconi understood the potential of long range communications for both maritime and international use. Whether he also anticipated and understood the details of the message handling business is not known but his advisors could see from the wire telegraphy business that all stations of the system had to be under company control.

Although the transmission medium was beyond anyone's control, the newly-formed company planned to own the facilities at both ends of their communications pathways. To assure control of marine communications, the shipboard stations were rented, not sold. The limited range of both ship-board stations and (in the early days) land stations meant that a chain of stations had to be installed throughout the world.

Therefore additional companies had to be set up in the several nations where maritime traffic would be heavy. World-wide communications could eventually be developed by increasing power, building larger antennas and improving detectors. Besides maritime messaging, the land stations could also be utilized to serve world-wide business interests. To carry out both functions, it was decided to put two subsidiary companies in place. The first was to operate between Europe and America and serve ships sailing in western waters. This was accomplished in 1899. The new company was incorporated in the state of New Jersey as the Marconi Wireless Telegraph Company of America (hereafter called American Marconi).

The second subsidiary company was organized in 1900 as the Marconi International Marine Communications Company. Shortly after it was set up, it opened stations in England and Ireland.

The primary source of income for the Marconi companies was the marine message service. Initially this was not a big business, but with the recognition of the importance of wireless communications to ship safety it grew quickly. As the number of stations and the revenues they earned increased, the Marconi companies became a world force.

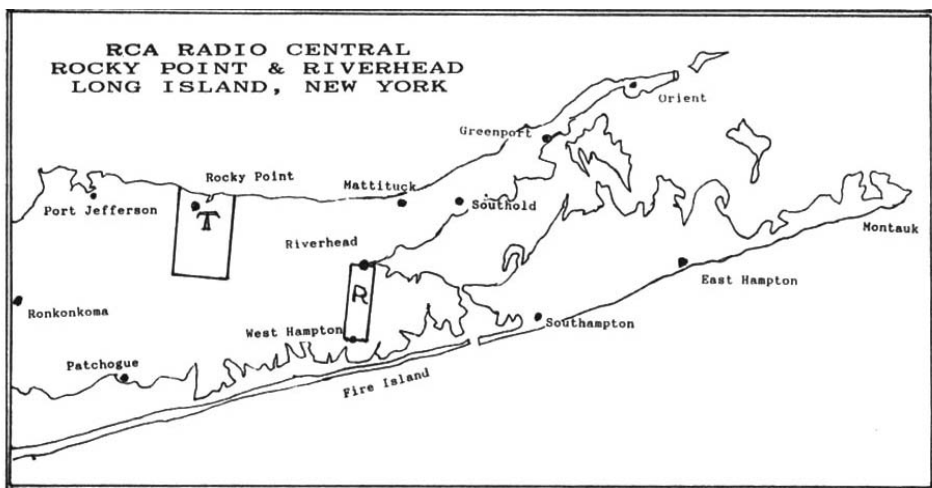
Wireless companies other than Marconi's had been started, (de Forest's being one example) but they were not operated in the same tight, businesslike manner. The policy of the Marconi companies was to limit the technical upgrading of station equipment and to carefully limit service. For example, Marconi stations would communicate only with other Marconi stations. These practices maintained moderate growth while avoiding over-extension that might threaten the survival of the companies. However, they also had the unpleasant flavor of monopoly.

By 1908 American Marconi had grown to five land stations and 40 marine stations. It bought United Wireless and thereby added 50 land and 400 marine stations. The company had also grown in its handling of international traffic. Trans-atlantic message service was routed

other facilities that it had used for war purposes to their owners or to have the law changed so that the government could stay in the public radio message service.

Changing the law would have been counter to American attitudes toward government. Still, the Navy was reluctant to return the bulk of American radio communications to what seemed to be a foreign agency. Though it was argued that American Marconi was not a foreign company, the Navy knew that the controlling interest was held by British Marconi.

The solution to the problem was to have the British interests bought by an American Company. At that time (1919), General Electric was negotiating with Marconi about supplying Alexanderson alternators for use in international message service. The Navy prevailed upon GE



Locations of the RCA transmitting and receiving facilities at Rocky Point and Riverhead, respectively.

through the station at Glace Bay, Canada and could provide service 20 hours a day.

Modest growth continued until the beginning of World War I when the Navy took over nearly all of American Marconi's facilities, including the coastal stations and the shipboard stations on ocean-going vessels. This put American Marconi out of the trans-atlantic message service business but not out of the radio equipment manufacturing business.

As early as 1907, a factory had been set up in Aldene, New Jersey (near Elizabeth) to produce and modify wireless equipment for the company. This operation mushroomed into a major manufacturing facility that produced equipment for the Navy. With the cessation of hostilities, the Navy either had to return all the stations and

to help resolve the problem.

It was arranged for GE to start a new company that could take over the British interests and receive the stations held by the Navy. That company was incorporated in November 1919 as the Radio Corporation of America. Almost all of the assets, financial, capital, technical and human were transferred from American Marconi to the Radio Corporation. Included was what turned out to be the single most important asset of all, David Sarnoff. American Marconi was dissolved as a corporation in April 1920.

RCA hit the ground running. The patents held by British Marconi as well as those held by American Marconi and, more important, those held by GE became the engineering base of the

(continued on page 36)

A SIMPLE “MOPA” ADAPTER FOR THE 1929 QSO PARTY

If you participated in the last 1929 QSO Party this past December, you couldn't have helped notice the marked increase in MOPA transmitters being used in the event. The acronym “MOPA” stands for “master oscillator-power amplifier.” Adding a power amplifier stage to the oscillator stage provides increased efficiency and isolation from frequency drift caused by wind-blown, swinging, antennas and feedlines.

At 10 watts input on 80 meters, the output of my “bare” Hartley oscillator measured 3.5 watts. Compare this with the almost 7 watts put out by an added PA stage with the same input. And I noticed considerable improvement in signal stability, even under windy conditions.

Now that 40-meter operation is allowed in the QSO Party, we need to pay even more attention to the quality of the signal. Stability issues are substantially more critical on this higher-frequency band.

Back in the late nineties I designed a PA stage attachment that could be connected to an 80-meter Hartley, or other oscillator-transmitter, to provide operation on both 40 and 20 meters. (See the “Amateur Radio” column in *The OTB for August, 1999* [40-3]—ed.) It was intended primarily for use in the Linc Cundall OT CW contest, where 40-meter operation was permitted.

The tubes suggested for that rig included the 6L6, 6F6, 6V6, 807, etc. These met the “OT” rules of the time, which specified that equipment be of pre-war origin to be considered vintage. However, these tubes do not comply with the 1929 QSO Party requirements. A tube type in use during 1929 or earlier would be required.

After a socket change, I was able to plug in an 865 tetrode (introduced in 1929). It worked well. A 210 was tried with even better results. The latter would provide 20 watts input on 40 with just 400 volts on the plate or 13 watts operating straight through on 80. A small variable capacitor (30 uF) was all that was required for neutralization during straight through operation (Fig. 1).

No neutralization is required when the PA stage is used as a doubler to get to 40 meters (*Doubling in the final provides lots of harmonics —j.s.*) How-

ever, the 30 uF variable can be left connected, so that the only changes necessary to switch bands is to swap the tank coils, retune the “PA” stage, and set the oscillator frequency.

Obviously, the earlier tubes are also ok for the “OT” contest. In fact, I plan to use it on both 40 and 20 meters by running the oscillator on 40 and doubling in the PA stage as before when the beam-power tubes were used. The 210 requires a bit more excitation than the tetrodes and pentodes but a 45 or 210 Hartley has adequate drive to make the triode perform.

The neutralization for straight-through operation is simplest when a Hartley oscillator is used as the “MO.” However, a TNT, TPTG, etc. can still be used with a few small modifications to the PA stage circuit. The PA tank coil needs to be wound with a center tap (Fig. 2) and/or a split stator variable condenser (Fig. 3) so that plate neutralization can be utilized effectively. I'd recommend the circuit of Fig. 3 if you are considering modulation for AM operation. That circuit will minimize the possibility of regeneration.

You may build the PA stage on a 1/8" piece of aluminum plate, as I did, or on a wooden baseboard if desired. I simply used 1/2" wooden dowels as stilts to locate the PA right above the tank coil of my Hartley. Velcro pads on the bottoms of the stilts and the oscillator breadboard make for quick, easy-to-remove attachment.

A connection is made directly to the plate end of the oscillator tank coil for excitation. And if using a Hartley oscillator, the neutralizing voltage is obtained from the grid end of the tank.

The frequency setting and zero beating process on 40 and 20 meters becomes quit critical because of the frequency multiplication. This is an issue you have to take up with your oscillator. I use a 30 uF variable across the oscillator as a trimmer. You might want to add a vernier drive to this capacitor to achieve even better control.

It should be noted that to get a T9 report from the PA you have to put a T9 in. The PA stage won't clean up a poorly working oscillator set.

If you already have a heavy duty power supply running conservatively with just your oscillator

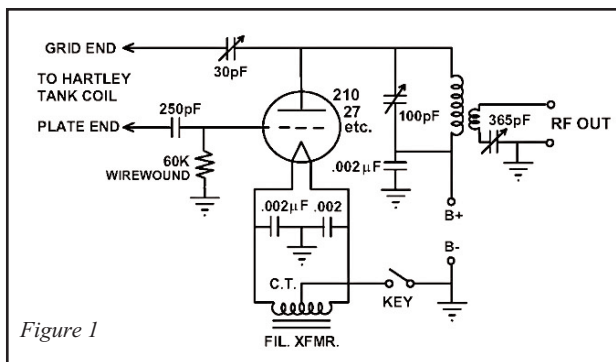


Figure 1

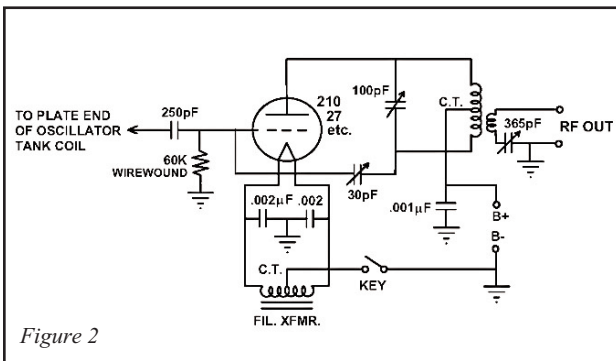


Figure 2

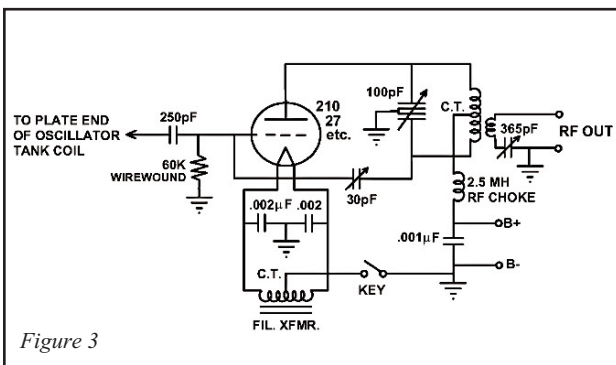


Figure 3

Figures 1, 2 and 3 (top to bottom) show three variations on the "add-on" PA circuit. See text for details.

attached, the addition of this final shouldn't substantially affect the voltage stability. Otherwise you might have to provide a separate supply for the PA.

With a 400 volt supply the 210 can be run at 50 mA during the 20-watt segments of the contest. For the 10-watt segments, PA coil coupling can be reduced so that the tube draws 20 to 25 mils. It then produces an output of five watts.

I also tried a type 45, and it worked just fine

for straight-through operation. As a doubler, however, the efficiency fell to just 30 percent because of the 45's low MU. The 210, operating at 50 percent efficiency in the doubler mode, was much easier to drive. I recommend the type 10 for this project.

The commonly available type 27 also works well. At 10 watts input on 40 meters, working as a doubler, it matched the 5-watt output of the 210 tube. Though the tube has very similar characteristics to the 210, I don't recommend pushing it to 20 watts input as a doubler. Run it at 15 watts input maximum as a doubler during the 20-watt periods of operation.

Shoot me an e-mail or letter on your progress or comments along with any questions. I'll do my best to help you.

Notes on Parts and Adjustment

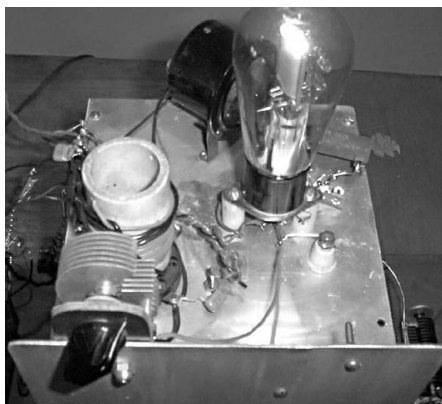
Use 4-pin coil forms types for the circuit of Fig. 1; 5-pin types for the other two circuits. Antique Electronics Supply (see their ad in the business card section) can supply the forms if you don't have them in your junk box. You can even make forms from sections of PVC pipe glued to tube bases. Use 1/4" to 1/2" o.d. stock.

For 80-meter operation, 30 turns of #18 wire, plastic coated or enameled, should be wound close spaced. Wind 6 turns at the cold end of the coil for the link. However, in the case of the circuits of figures 2 and 3, the link should be centered.

For 40-meter operation, use 16 turns of the #18 wire, wound as above, with 4 turns on the link.

For 20-meter operation, 8 turns of the #18 wire spaced to take up about an inch on the form, with 3 turns on the link.

Capacitor values and types are not critical. Use disc, ceramic, mica, etc. with appropriate voltage ratings. Variable capacitors are available

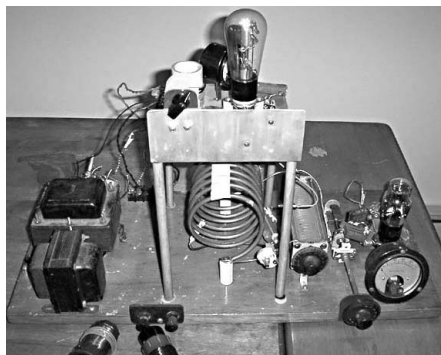


Author's version of PA circuit is built on 1/8" aluminum plate. The tube is a type 10.

from Antique Electronics Supply, or use something close from your junk box. For the neutralizing capacitor you might use two or three of the types specified for the trimmer in series to get the required voltage and capacitance ratings.

Adjust the neutralization for the purest note and least amount of frequency change while tuning the PA stage through resonance.

I key my oscillator in the filament CT return. The filament CT return for the PA is connected



The completed PA unit is mounted atop the Hartley breadboard on stilts. Note velcro pads (see text). The 20-meter coil is in the socket; the 40- and 80-meter coils are on the table.

in parallel with that so that both are keyed simultaneously.

Use a wirewound resistor for the grid leak and you won't need an RFC. If you don't have the correct value of wirewound resistor, use the closest lesser value you have and make up the difference with a series-connected carbon resistor or resistors. If you are going to use a type 27 tube with a cathode, key it from cathode to ground along with the oscillator. ☐

RADIO CENTRAL, *continued from page 33*

new company. The Alexanderson alternators at New Brunswick and the new ones that Marconi had ordered were the means that could lead RCA to world leadership in communications. However, first there were problems that needed to be solved. The Marconi antennas had traded height for transmitter power. They performed poorly in receiving because they offered no noise reduction. New antennas were needed. Receiving and transmitting stations near big cities suffered from both interfering noise and from the incompatibility of high powered transmitters and their antennas with urban life.

RCA's potential growth was also limited by the size of the Marconi facilities. Much larger ones would be needed to accommodate the expected increase in international traffic. That story is told elsewhere in this *Gazette* (it will be reprinted in an upcoming issue of *The AWA Journal*—ed).

It was decided that the new stations could best be located along the sandy shore line of the ocean, especially in places where the pathways to the other stations in the link would not cross

any noisy sources. But because messages originated from, and were delivered to, New York, the international station had to be located where land lines could be established to handle traffic to the city.

These requirements pointed to locations like New Jersey (where Belmar and Tuckerton were already operating), Massachusetts (where Marion had been established), and Otter Cliffs, Maine, (where Beverage had done some of his wave-antenna experiments). There was, however, another location, previously used for experiments by Marconi, that met these requirements even better. This was the eastern end of Long Island.

Early in 1920 RCA purchased property at Riverhead (see map) and set up a receiving station. At the same time, a transmitting facility was established at nearby Rocky Point (16 miles to the northwest). These stations were connected by telegraph and telephone to the main offices in New York, 80 miles to the west. Although the facilities were modest in their beginnings they eventually became "Radio Central," the center of the RCA world-wide communications network. ☐

RE-CREATING REGINALD FESSENDEN'S LIQUID BARRETTTER

Part 1 — Building a Replica

Reginald Fessenden was born in 1866 in Knowlton, Canada East (now Quebec). He was precocious as a child, and at age 16 was hired to teach mathematics at Bishops College School, Lennoxville, Quebec. Four years later he was principal of Whitney Institute, a small school in Bermuda. From 1887-1890 he worked at Thomas Edison's Laboratory, and from 1890-1892 he worked for Westinghouse in Pittsburgh. In 1892 he was selected as chair of electrical engineering at Purdue University although he held no university degree, and a year later he was recruited to the same position at the Western University of Pennsylvania (later the University of Pittsburgh) through the influence of George Westinghouse.

In 1900 Fessenden (Figure 1) joined the U.S. Weather Bureau to help them transmit weather forecasts, but soon fell out with his supervisor and left in 1902. With two Pittsburgh millionaires, T.H. Given and Hay Walker, he formed the National Electric Signaling Company (NESCO),

a firm which survived for the next ten years.¹

Fessenden's inventions were guided by a strong grasp of both theory and mathematics. He was the first inventor who saw that signaling needed to change from spark technology to continuous wave technology.²

He wrote the specification from which Ernst Alexanderson at G.E. developed the famous alternator, which for the first time was conceived as a transmitter itself, not just as a source of power.

The receiver in Fessenden's system was, he claimed, a thermo-electric one he called the "liquid barretter" and was patented in 1903. Signals were detected at a heated junction between platinum wire and nitric acid. The heating aided the rectification at the junction, and was augmented by a bias battery. However, in a fairly recent study of electrodes in an electrolyte solution, Geddes et al. make no mention of the temperature of the electrolyte as a contributor to its rectification properties.³

In a report to the Smithsonian Institution in 1908, Fessenden conceded that electrolytic detectors invented by others also worked, but his worked better. He said that perhaps he was just more familiar with operating his own!⁴ The courts awarded the liquid barretter patents to Fessenden. In the decade between 1903 and 1913, this device was the predominant continuous wave detector in commercial use. Apparently none remain, the one at the



Fig. 1. Reginald Fessenden

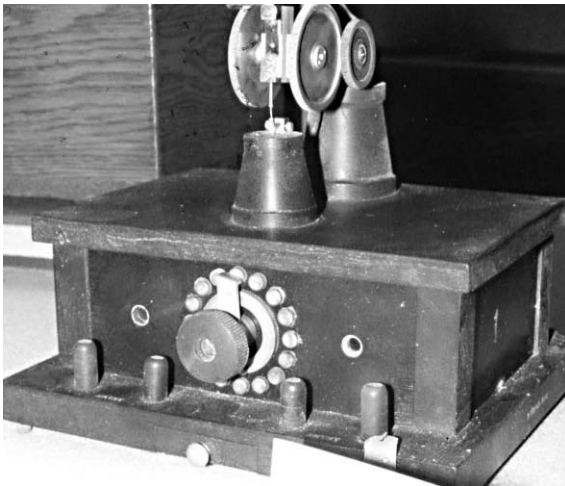


Fig. 2. Liquid barretter at the Ford Museum in Dearborn, MI. Larry Babcock photo.

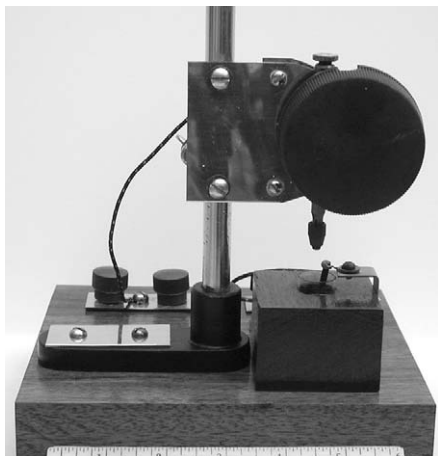


Fig. 4. The version of Fessenden's liquid barretter which did not work.

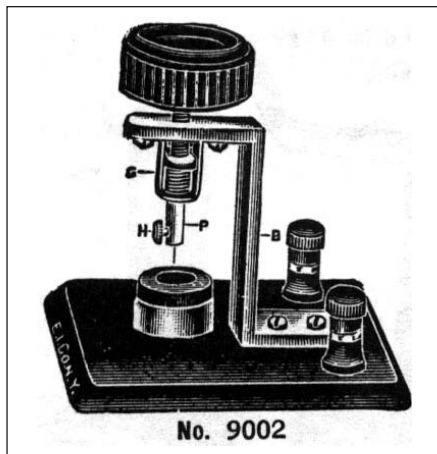


Fig. 5. Electrolytic detector from 1914 E.I. Co. catalog.

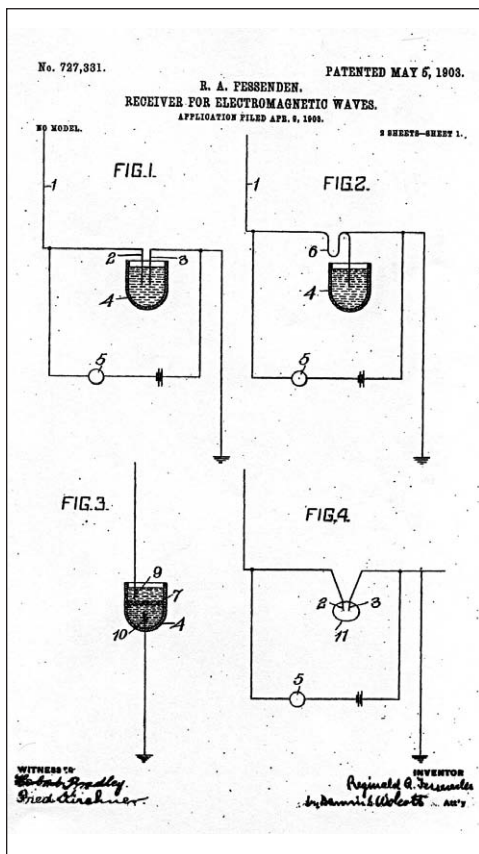


Fig. 3. Drawings from U.S. patent 727,331 granted May 5, 1903.

Ford Museum in Dearborn MI being a replica (Figure 2).

Fessenden's pioneering voice transmission in December 1906 was made with a wireless system that included the liquid barretter.

Creating a Replica

I was interested in creating a replica of Fessenden's liquid barretter, but because no detailed plans of the device remain, I decided to make a working model rather than attempt a look-alike model. I relied most heavily on the information in Fessenden's U.S. patent no. 727,331 dated May 5, 1903. It specified a fine pointed platinum wire of .0004 inch diameter just touching the surface of nitric acid in a glass vessel. A second platinum electrode was formed into a small coil (see Fig. 3 in Figure 3).

The fine platinum wire was Wollaston wire, .002-inch platinum plated first with silver and then further drawn to the smaller diameter. The silver was etched off by acid. I chose instead to work with the .001-inch platinum wire now available (Surepure Chemetals Inc., Florham Park, NJ). I doubted whether Fessenden had at his disposal the equipment necessary to measure the final diameter of his platinum wire.

I made a stand capable of holding a glass cup of acid, of clamping both electrodes in place, and of raising and lowering the anode. The base was a block of 6x7x1.5 inch solid Honduras mahogany finished with shellac. The bias voltage in my model was controlled externally, whereas in the liquid barretter I

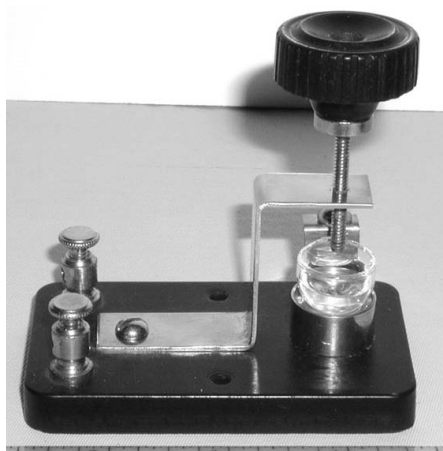


Fig. 6. My first try at a detector modeled after the one shown in the E.I. Co. catalog. I used a glass acid cup instead of the original graphite one. It produced faint signals.

suspect it was controlled internally. The anode was of 0.001 inch platinum wire as stated, and the cathode was a 1/2-inch length of 1/8-inch diameter carbon rod removed from a AAAA-size lead-acid battery (see Figure 4). The anode was held place in a jeweler's pin vise.

Though Fessenden specified nitric acid, others have seem to have used sulfuric acid. Fessenden never indicated the acid concentration although others have suggested 20%. To test my detector, I installed it in a "SkyWaves" crystal set designed by Al Klase and described at the 1999 AWA conference, and on his Web site.⁵ The detector failed to work.

I substituted a simpler detector stand fashioned after one shown in the 1914 E.I. Co. catalog (Figure 5). It had a similar arrangement of electrodes in a glass cup, but the cathode was a coil of about 3 inches of the same platinum wire (Figure 6). The anode was about 1/4 inch of platinum wire soldered into the advancing screw. A glass cup was used to hold the acid rather than the graphite one in the catalogue illustration. This detector worked, but signals were very faint.

I found that it worked best when the wire was just about drawn up out of the acid, and possibly pulling on the surface tension. I do not know why the device worked in this way. I mention this only as a speculation. I can hardly see 0.001-inch platinum wire without a magnifying glass. I certainly can't see when it dips into the acid, but can hear the result in the headphones. When I hold the wire between my fingers I cannot feel it.

In comparison to the 1N34A diode in the Sky-



Fig. 7. Here's my revised E.I.-inspired detector with a graphite acid container substituted for the glass one. This worked better.

Waves crystal set, I measured the output of the liquid barretter (now just an electrolytic detector) at -12 dB using a 830 kHz AM carrier and 1 kHz modulation at 50%. My experimentation with a DC bias yielded no positive effect.

Re-Doing the Acid Cup

I presented my detector project, in this form, at the 2004 Antique Wireless Association Conference, and collected quite a number of useful suggestions from those present. After returning home, I decided to substitute a graphite acid cup, as shown in the E.I. Co. catalogue, for the glass one.

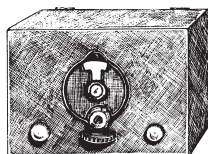
A 7/8-inch diameter carbon rod was obtained from a number 6 dry cell. Because I was reluctant to try turning the rod to a smaller diameter and because I wanted to leave a lot of carbon between myself and the acid, I left the diameter at 7/8 inches and cut off a 1/2-inch slice with a band saw. Then I carefully drilled a hole about 1/4 inch deep with a sharp bit. Both the carbon disc and the drill were held in a Unimat lathe.

I then turned a brass cup in which the carbon fit loosely and was held by a set screw. The cup was screwed to my detector stand (Figure 7). The feed screw holding a short (about 3/8 inch) piece of platinum wire was now held over the hole in the carbon disc. I added a threaded bushing below the tapped hole in the bracket to minimize the play in the adjustment.

Part 2—Evaluating the Reconstructed Barretter—will appear in the July issue of The Journal. The complete reference list will be included at that time. ☐

AMATEUR RADIO

EDITED BY **JOHN F. ROLLINS, W1FPZ**, HC 33, BOX 150, ARROWSIC, MAINE 04530
PLEASE INCLUDE SASE FOR REPLY.



Bruce Kelley Memorial 1929 QSO Party Results for 2004

The 1929 QSO Party was held during the first and second week ends in December 2004. In past years this test had always been confined to the 80 meter band. This year, at the urging of some of our AWA members, the event was expanded to include the 40 meter band. This was done with the hope that it would improve the chances to make East-West contacts.

Interestingly, the only successful East-West QSOs made during this test were done on 80 meters. Part of the problem may be that many of our participants have not yet geared up to 40 meters. Nevertheless, the plan to include 40 meters has had enthusiastic backing and we shall plan to continue the two band use for the '29 test.

Several of the members suggested that we consider devoting one of the week ends to 80 meters and the other to 40 meters. I'll have to pass on that suggestion. Years ago the '29 test was held only on one weekend. Several times poor weather conditions wiped out most of the signals. It was for this reason that Bruce Kelley decided to hold the event on two weekends. If conditions happened to be bad on one weekend, the second one could save the day.

Overall participation was down, in spite of four very enthusiastic first timers who joined our ranks with some beautiful rigs. A total of 49 par-

ticipants were active in one or both bands. As usual there were a few participants who chose not to submit their logs—always disappointing. Conditions seemed to be fairly good over most of the country in spite of some local areas subjected to bad weather.

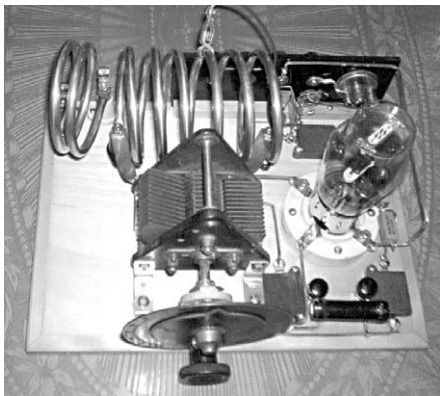
The top ten contenders were led by Bob, W2ZM with 67 contacts and Scott, WA3FFC nipping at his heels with 62 contacts. Good going to both, and Bob, it was great to hear you on after several years absence.

Most of the participants used Hartley oscillators as you'll see below.

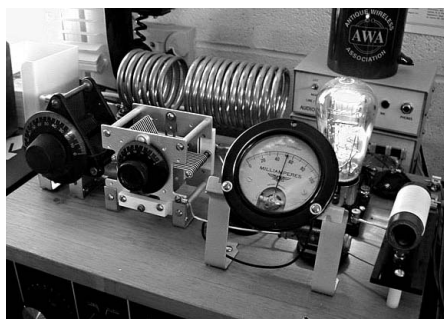
Top Ten QSOs

CALL	TOTAL	CALL	TOTAL
W2ZM	67	W2A0	37
WA3FFC	62	VE3CUI	35
N8YE	54	KB0ROB	31
N4GJV	52	K3DZ	31
W2IRS	48	NE1S	30

Hartley	19	TPTG	5
TNT	11	Colpitts	3
MOPA	15		



Here is a pair of beautiful 1929 self oscillators built by Larry, NE1S. The Hartley (left) is on 40 meters and the TNT is on 80.



A beautiful '29 TNT built by Gary, WA4IAM, who paid great attention to the use of proper period parts.

So there it is for another year. I received some wonderful pictures of 1929 rigs made by some of our members, and these are which are always appreciated. Thanks also for comments and notes that many of you sent.

Re 40 meter equipment—later this year I hope to put together an article on 40 meter construction techniques—what works and what doesn't, which I hope will help some of you who are contemplating building a 40 meter rig, '29 style. Apologies to you old time hams who already know how to build them! *Note you'll also find two separate articles dealing with how to get on 40 meters 1929 style elsewhere in this issue—ed.*

Best 73 to all,
John, W1FPZ

Complete Contest Results

CALL	TRANSMITTER	POWER	QSOS/BAND		TOTAL POINTS
			40	80	
W-1					
NE1S	'29 HARTLEY	9W	12	18	30
	'29 PP TNT				
NV1X	'29 TPTG	8W	3	14	17
W1YT	'29 XTAL OSC	5W	3	5	8
W1FPZ	'29 COLPITTS	10W	5	12	17
W1TSP	'29 HARTLEY	10W		20	20
K1FI	'27 MOPA	10W	11	1	12
W1GIG	'29 TPTG	7W		12	12
K1GDH	'29 HARTLEY	7W	5	11	16
W-2					
W2IRS	'29 HARTLEY	10W	10	38	48
K2KK	'29 HARTLEY	6W		11	11
W2AO	'29 HARTLEY	5W	17	20	37
W2ZM	'29 HARTLEY	9W	22	45	67
KE2O	'29 TNT	9W		17	17
K2LP	'29 TPTG	4W		23	23
W2HBE	'29 HARTLEY	8W		5	5
W2CQH	'29 MOPA	10W		8	8
WA2NPL	'29 HARTLEY	10W	3	11	14
W2VDX	'29 HARTLEY	9W	6	14	20
KB2PLW	'29 TNT	3W	5	10	15
N2VO	'29 TPTG	9W	15	15	
W2TM	'29 MOPA	10W	8	8	
N2JPR	'29 HARTLEY	5W	5	5	
W-3					
W3HWT	'32 MOPA	10W		2	2
WA3FFC	'28 MOPA	10W	21	41	62
W3FJJ	'29 HARTLEY	7W		8	8
K3DZ	'29 XTAL MOPA	6W	6	25	31
W-4					
K4JYS	'29 TNT-OIA	3W		28	28
K4LJH	'29 HARTLEY 211	10W		24	24
WA4IAM	'29 TNT	10W		24	24
AA4RM	'29 PP HARTLEY	9W		19	19
W4VBX	'29 TNT	9W		1	1
N4GJV	'28 MOPA	10W	12	40	52

CALL	TRANSMITTER	POWER	QSOS/BAND		TOTAL POINTS
			40	80	
W-5					
K5MO	'29 TNT	10W		6	6
KC5TJG	'29 HARTLEY	10W		18	18
K5RB	'28 HARTLEY	6W		18	24
	MOPA				
W-6					
W6DJX	'29 TNT	10W	4	12	16
K6TQ	'29 TNT	10W		11	11
W6DTP	'29 TNT	10W		1	1
W-7					
W7LNG	'29 PP '25 HARTLEY	10W	3	2	5
W-8					
K8JWR	'29 MOPA	10W		10	10
N8YE	'25 TPTG	10W	13	41	54
W8ZNX	'29 MOPA	10W		9	9
K8NI	'29 COLPITTS	10W	MOD	3	3
W8KGI	'29 HARTLEY	10W	4	11	15
W-9					
AA9DH	'29 TNT	10W	7	16	23
WA9WFA	'27 MOPA	9W		15	15
W-0					
KBOROB	'29 COLPITTS MOPA	10W	10	21	31
	'29 HARTLEY MOPA				
VE					
VA3AWA	'29 MOPA	10W		8	8
VE3CUI	'29 MOPA	10W		35	35

AWA AM QSO Party Results

By Marc Ellis, N9EWJ

This contest had its beginnings a few years ago, when Randy Haus, KB2PLW, and I began to chat about the AWA on-air events. We agreed that the time had come for a contest that would include AM operation and decided to initiate one called "30s Night." 1939 and earlier gear would receive vintage credit, and both phone and CW operation would be allowed. The contest debuted in April, 2003 and, though participants seemed to have a good time and to enjoy having an opportunity to dust off their AM equipment, the number of participants was disappointingly low.

The following year, to simplify the scoring and focus more on the AM mode, we decided to eliminate CW from the event. This improved participation a bit, and we continued to receive comments that convinced us of the great interest many still have in AM operation.

So this year we decided to go for broke—giving vintage credit to all gear manufactured prior to 1966 and adding additional bands. And we took an additional, somewhat unusual step. With the approval of the Amateur Radio discussion

group at the 1994 Annual Conference, we threw the contest open to all hams—our first event not restricted to AWA members.

I wasn't able to participate in the event myself, but from the many enthusiastic notes I received, I gather that Randy and I have hit the jackpot. There were comments that the frequencies were alive with more AM operation than had been heard in anyone's recent memory. Ed Gable, our museum Curator, and his staff, added a great deal of romance to the contest by activating and operating W2AN, the legendary James Millen's personal transmitter—giving many the opportunity not only to hear it for the first time but to work it.

I received only about thirty logs, but the entries in the logs I did receive show that well over 175 stations were participating. Not too shabby! And several people were said to remark that they were going to join AWA because of their positive experience with our event—an outcome we were definitely hoping for.

Without further ado, here are the results based on the logs I did receive:

Top Ten QSOs

CALL	TOTAL	CALL	TOTAL
W2ZM	2730	W2VDX	435
W2AN	1062	NE1S	408
W3R	1035	W2IOG	405
WA4IAM	612	WA2CJS and WA3KLR	387
W0YVA	564	W1ZB	360

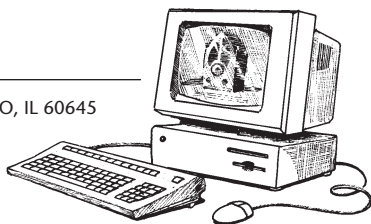
Complete Participant List

K1DC	Collins 30FX	SX-24	220
W1DDW	Swan 350	Swan 350	10
K1GDH	Ranger	National NC-300	135
W1GIG	RCA ACT-150	SP-600	
	ELMAC AF-67		267
NE1S	W1DF exciter	National FB-7	
	Ranger 1	R390	408
W1ZB	Harvey Wells T-90	SX-24	360
W2AN	James Millen's rig	HRO 5TA1	
	+ Viking 1	SX-101	1062
WA2CJS	HB Heising mod 6L6	HB "Super-Rehetrogen"	387
W2DGB	Ranger	Collins 75S-1	120
W2IOG	Millen Xiter—HB mod	75A3	405
W2LID	Kenwood 570SG	570SG	80
K2ORC	HB—1956 <i>Handbook</i>	HQ-170	
	Viking II	SX-100	205
W2RS	FT-102	75S-1	232
N2TAI	DX-100	Drake R4	54
W2VDX	1939 home brew	HQ-129X	435
W2ZM	Ranger	75A-4	2730
W3HWT	Hallicrafters HT6	Hammarlund Comet Pro	225
K3JRR	Viking Valiant	Hammarlund HQ170-A	72
WA3KLR	Collins 32V-3	HQ-120X	387
W3R	Collins 32V2	Collins R390A	1035
K3TVC	Heathkit DX-60A	Heathkit HR-10B	18
W3VVS	Ranger II	National 183D	24
WA4IAM	Millen 90801	75A-4	612
K4JYS	Viking II	HQ129X	15
K4KY0	Viking II	75S1	27
K4LJH	Wilcox 99C-250TL final	HRO	40
W8AP	Yaesu FT-1000D	Yaesu FT-1000D	10
KC8DDH	Viking II	NC-400	9
W8KGI	Collins 32V3	75A4	24
WD8OFB	Argonaut V	Argonaut V	20
K9FH	Kenwood TS-940	Kenwood TS-940	1
W0YVA	Collins KW-1	Collins 75A-4	564
VE3FGU	Viking 500	SX115	84

ON THE INTERNET

EDITED BY **CHUCK SCHWARK**, 7454 N. CAMPBELL AVE., CHICAGO, IL 60645

PLEASE INCLUDE SASE FOR REPLY. E-MAIL: caschwark@aol.com



Microphones on the Web

Whether you listen to radio broadcasts, phono disks or cylinders, magnetic tape, or bits and bytes, it all starts with soundwave energy being converted to electrical impulses. The microphone, in all its shapes, sizes and incarnations, is the instrument that does it. The following links and websites can enhance and help broaden your perspective and knowledge about these fascinating electrical and electronic marvels. Some of the links may have been covered by our resident mic expert, George Freeman, in his excellent *Journal* column "Mics and Men."

"Is this thing on? Testing...2...3. Do you hear me now?"

Learning About Microphones by Stan Coutant

<http://www.coutant.org>

These pages are designed to introduce you to the types of microphones used in broadcasting and recording studios. Many of the classic mics shown still exist and continue to provide superb audio quality.



Vintage Classic Broadcast Microphones by Jim Steele

<http://www.k-bay106.com/mics.htm>

Vintage microphone photo collection, history & Development, documentation, parts & accessories, repair and reconditioning, and more.

Russian Microphone Muzeum (author's spelling) by Michael Vladimirovski
<http://www.microphones.ru/index.htm>

A great Russian microphone website. Well worth fully exploring.



Neumann Anniversary Book

<http://www.neumann.com/book/book.htm>

The history of the Neumann Company and Georg Neumann along with the firm's classic and legendary microphones such as the U47, M50 and others.

Airborne Microphone Museum

<http://www.airborneaudio.com/aap/interest/mics.htm>

Airborne Audio began operations as a Kansas City recording studio in 1988 and has a very good online virtual museum of mics of all kinds.



Museum of Early and Historic Microphones

<http://www.chss.montclair.edu/~pererat/mpermic.htm>

A great historical site of early and modern microphones by AWA's own Tom Perera.



Vintage BBC Microphones and Broadcasting Equipment

<http://www.roger.beckwith.brinternet.co.uk/bh/mics/micsmenu.htm>

On these pages are pictures of old BBC radio equipment and memories from the people who used it. Very nice 'snap-shots' of times and places in BBC history.

American and Japanese Microphones from the Past by Bert van Oortmarssen

<http://www.xs4all.nl/~odemar/microphones/usa-mics.htm>

European Microphones from the Past by Bert van Oortmarssen

<http://www.xs4all.nl/~odemar/microphones/eur-mics.htm>

Bert has assembled some great pictures and information on these two sites.



VLADIMIR K. ZWORYKIN'S CONTRIBUTIONS TO THE RCA ELECTRONIC TELEVISION SYSTEM

Part 2 — The Iconoscope

Note: Part 1 of this article, "The Kinescope," appeared in our October, 2004 issue. —ed.

While Vladimir Zworykin's Kinescope receiver represented a giant step toward making television a practical information and entertainment medium for home use, other work remained to be done. Still needed was a sensitive, portable electronic television scanning unit or "camera" which did not have the severe limitations of the mechanical television cameras then in use.

The principal limitation was due to the extremely small electrical signals produced by the mechanical systems. The Nipkow disks and rotating systems of mirrors used for scanning an

The video signals produced by this minute amount of light were exceedingly small. The electronic amplifying circuits then available provided only a small amount of help for this problem [5]. Attempts were made to install small lenses in the holes of the scanning disk in order to collect more light and focus it on the photocell. The use of lenses created some new problems, however. The lenses tended to separate from the scanning disk at high rotational speeds and acted as glass shrapnel. They also increased the overall size of the disk.

Even with the best mechanical scanner designs, the artificial light needed to illuminate the image being scanned was blindingly bright and unbearably hot. In addition, the precision align-



A replica of Zworykin's first (1925) Iconoscope built by RCA.

image to be transmitted had to rotate very rapidly. This was necessary to eliminate blur and flicker in the images produced. The result was that the light from any particular picture element of the image being scanned was captured and converted into an electrical signal for only a very small fraction of a second.

Zworykin calculated that if it were desired to have a mechanical scanner produce 24 complete images per second, with each image comprised of 240 scanning lines, light would be collected from each image element for only (approximately) one-half microsecond. As a result, only a minute amount of light reflected from each image element being scanned would reach the relatively insensitive photocell of the television camera.

ment that had to be maintained in these mechanical scanning units together with their physical bulk made the television cameras anything but readily portable. A totally new approach to image scanning was needed.

The First Iconoscope

Photographic film can produce an image under low light levels if it is allowed to collect or "integrate" the reflected light received from an object for an adequate length of time. All portions of the film collect light continuously for the duration of the exposure. The human eye operates in much the same way. Zworykin wanted to implement this principle electronically.

The design Zworykin wanted to develop for



Zworykin's improved (1931) Iconoscope with deflection coil yoke.

his television camera would combine the best features of continuous light collection with the fastest possible method of scanning. His ideas for a scanning system did not include the use of any moving mechanical parts. Scanning would be done totally electronically. It is not an exaggeration to say that Zworykin basically wanted to develop an artificial version of the human eye [14, 15, 16]. He used the name "Iconoscope" ("*icon*" meaning "image" and "*scope*" meaning "to observe" [5, 13]) for the device which would become the heart of his electronic television camera.

Although he was not able to implement his ideas very successfully at the time, Zworykin's initial television demonstration (likely in 1925) mentioned in Part I of this article had utilized an amazingly insightful first approach to the development of a suitable all-electronic television camera. A crucial component of this camera was a photosensitive plate consisting of a very thin film of aluminum oxide (an insulator) deposited onto a thin layer of aluminum metal [10]. A coating of tiny, discrete potassium hydride globules which formed a photosensitive "mosaic" was deposited on top of the aluminum oxide. The aluminum oxide insulated the potassium hydride globules from the thin aluminum layer. A collector grid of fine wires then was positioned in front of this photosensitive surface.

Illuminated portions of the photosensitive mosaic became charged by photoemission of electrons to the collector grid. As a result, tiny charged capacitors effectively were formed between the photosensitive potassium hydride globules and the aluminum layer. The aluminum oxide acted as the dielectric.

A scanning beam of electrons originating on the back side of the aluminum penetrated the metal layer and discharged the elements of the capacitor mosaic. This resulted in the production of a signal pulse proportional to the illumination on the scanned element of the mosaic. As all the elements of the mosaic were scanned rapidly, these

signal pulses formed a continuously varying video signal.

This first Iconoscope produced images of very low resolution. This was largely because satisfactory techniques had not been developed for controlling the vapor deposition of the photosensitive materials and for the precision focusing of electron beams.

The crude images produced by this camera were displayed on a cathode-ray tube receiver. This was a simple display device and was not the sophisticated Kinescope receiver Zworykin would develop in a few years. Neither the camera nor the receiver was totally electronic. The horizontal and vertical deflection voltages were produced using rotating mechanical generators.

While, by his own admission, the results of the first demonstration were "scarcely impressive" [10], the fundamental concept was proven to be sound. Zworykin then initially directed his efforts toward developing his Kinescope receiver. This receiver was successfully demonstrated it in 1929. He then directed his efforts on refining and improving his concept for a television camera.

The Improved Iconoscope

Zworykin had learned much during the intervening years since his first unimpressive television demonstration. In particular, he now knew much more about how to effectively deposit thin films of materials onto surfaces and how to focus electron beams.

Like his earlier electronic television camera, the improved Iconoscope consisted of two principal parts enclosed in an evacuated glass bulb with a long neck. Simply stated, the Iconoscope was basically a modified cathode ray tube (CRT) without a phosphor screen.

The first part of the improved Iconoscope was a photo-sensitive mosaic which consisted of a metal plate covered with a large number of miniature photoelectric cells. These photosensitive cells were insulated from the metal plate and were insulated from each other.

Zworykin now formed the metal plate by placing a conducting coating of aluminum on thin, insulating sheet, such as mica. This thin sheet had to be a good electrical insulator, have a high dielectric constant with low dielectric losses, and exhibit good mechanical strength. Later, other insulating materials replaced the mica.

The mosaic of photosensitive cells was formed by evaporating a thin film of a suitable photoelectric material on the side of the mica opposite from the metal plate. This evaporated

film was very thin and was deliberately made not continuous. Rather, it consisted of many minute, discrete and uniformly distributed globules of the photosensitive metal. Being discrete, the globules were insulated from each other.

When he first resumed work on the development of the Iconoscope, the photosensitive material Zworykin used was an alkali metal such as cesium. Later, he used a two-step process wherein globules or "cells" of silver were first vapor deposited onto the insulating sheet. The cells were then photosensitized with cesium in a separate process.

The metal plate in Zworykin's Iconoscope measured approximately 4 by 5 inches and contained some three million of the photosensitive cells. This resulted in a cell density of approximately 10,000 cells per square centimeter (60,000 cells per square inch)[14].

Every cell was a separate element of the photosensitive mosaic. As with Zworykin's earlier Iconoscope, each of the elements formed a tiny capacitor with the metal plate on the opposite side of the insulating sheet. The capacitance of an individual element with respect to the metal plate was determined by the size of the cell together with the thickness and dielectric constant of the insulating layer between the elements and the plate. This capacitance was used to store electrical charge and was critical to the operation of the Iconoscope. As the metal plate was common to one side of all the capacitors and was instrumental in creating the video signal, it became known as the "signal plate" [5, 13].

The second principal part of the Iconoscope was an electron gun. This gun produced the electron beam needed for scanning the mosaic of photosensitive cells. It was very similar to the electron gun Zworykin used in his Kinescope. A major difference between this new design and the design of his earlier Iconoscope, however, was that now the electron beam would scan the mosaic from the photosensitive side, rather than from the opposite side.

The electron gun of the improved Iconoscope consisted of an indirectly heated cathode mounted in front of an aperture in a control element. The control element was used to regulate

the intensity of the electron beam produced.

The first accelerating anode of the electron gun consisted of a long cylinder with three apertures spaced along an axis common to the cylinder, the control element, and the cathode. The gun was mounted in the neck of the Iconoscope tube. The neck was positioned at an angle with respect to the signal plate so that neither it nor the electron gun obstructed the projection onto the signal plate of the image to be televised.

The inner surface of the neck as well as a portion of the spherical bulb of the Iconoscope were coated with a metal film that served as the second accelerating anode for the electron gun. This metal film also served as a collector of the electrons emitted from the photosensitive mosaic.



An outdoor test of Zworykin's improved Iconoscope camera ca 1931.

The second anode normally operated at a potential of approximately 1000 volts while the first anode operated at a much lower voltage.

Focusing of the electron beam produced by the gun was achieved by electric fields created by potential differences between various parts of the electron gun and by fields between the gun itself and the metalized portion of the neck of the Iconoscope. These electric fields effectively formed "electrostatic lenses" [5, 13].

How The Image Was Created

The process by which the Iconoscope created a scanned image is straightforward. The image to be transmitted was continuously projected onto the photosensitive mosaic. Each element of the mosaic emitted electrons in proportion to the amount of light striking that element. As a result, the capacitors formed by the elements of the mosaic and the metal signal plate on the opposite

side of the insulating sheet became positively charged.

The amount of this positive charge was proportional to the amount of light striking the corresponding photosensitive element of the mosaic. Each capacitor held its charge until it was discharged by the scanning beam from the electron gun. The discharge current from each capacitor was proportional to the positive charge on it and, hence, to the intensity of light that fell on that photosensitive element [5]. The mosaic of photosensitive capacitors effectively acted as an electronic video "memory" since each element stored information about the light intensity from a minute portion of the image [14, 15, 16].

The beam from the electron gun scanned the elements of the mosaic sequentially from the photosensitive side. The electrons now did not have to pass through the metal film and insulating layer of the mosaic. As a result, the electron beam remained more tightly focused.

The deflection of the electron beam necessary to cause it to move from element to element was produced by magnetic fields. The source of these magnetic fields was a yoke of four deflection coils which fit over the neck of the Iconoscope. The scanning was linear, both horizontally and vertically, and was produced by sawtooth shaped electrical signals which were applied to the deflection coils. The sawtooth signals were produced by specially designed vacuum tube circuits [5].

The resolution of the picture produced by a device working on the Iconoscope principle is determined by both the size and number of photosensitive elements in the mosaic and by the size of the scanning electron beam. In Zworykin's device, the number of individual photosensitive elements in the mosaic was many times greater than the actual number of effective picture elements. This was due to the fact that the diameter of the focused scanning electron beam was deliberately made substantially greater than the size of the individual photosensitive elements.

If the diameter of the electron beam had been equal to or smaller than the size of the individual photosensitive elements, the job of producing an image with an accurate representation of the true shading of the object being scanned would have been much more difficult. Each of the individual photosensitive elements would have had to have been precisely the same size and the spacing between them would have had to have been perfectly uniform. This would have been virtually impossible for Zworykin to have achieved with the technology he had available.

With the scanning electron beam size being considerably larger than the individual elements,



Philo T. Farnsworth

the only requirements for an accurate image were that the average cell density and other average properties of the photosensitive material be the same throughout the mosaic. This requirement was satisfied much more easily [5, 17].

The 4 by 5 inch mosaic of the Iconoscope produced an image with 240 horizontal scanning lines. The distance between two successive scanning lines was .016 inch and the diameter of the electron beam was about half this value. The result was an image comprised of approximately 76,000 effective picture elements. Each picture element consisted of nearly 40 photosensitive cells, on the average. Accurate positioning of the scanning electron beam was crucial and required both a carefully constructed electron gun and precisely generated deflection signals.

Television Broadcasting Begins

By 1933, Zworykin and RCA were ready to announce the successful development of the Iconoscope in both technical and non-technical publications [5, 14, 15, 16, 17]. The theoretical sensitivity of the Iconoscope, when producing a 4"x5" image with 240 horizontal scanning lines, was over 70,000 times greater than that of a mechanical scanner. Initially, however, only 10 percent of that theoretical sensitivity increase was actually achieved [15, 16]. Improvements in photosensitive materials and manufacturing processes would later increase that figure substantially. The sensitivity of Zworykin's Iconoscope in 1933 was claimed to be "approximately

equal to that of photographic film operating at the speed of a motion picture camera" [14, 16].

Following the announcement of the Iconoscope's development, numerous predictions were made concerning the valuable functions television would soon be serving. The broadcasting of programs for entertainment was not the only purpose television would serve.

It was known that the Iconoscope was sensitive to both infrared and ultraviolet light, as well as to visible light. The ability to mount a television camera and transmitter in an airplane and to observe an enemy's military activities under cover of darkness was immediately recognized since moving motorized vehicles emit infrared radiation due to the engine's temperature. Also recognized was the ability to mount a television camera on a microscope and observe certain biological reactions and processes which are visible only under ultraviolet light [16].

RCA initiated a limited schedule of experimental television broadcasting in 1933 using Zworykin's all-electronic television camera and receiver. The initial broadcasts were made from the company's facilities near Camden, NJ with the television studio located 1000 feet from the transmitter. Anticipating the future need for telecasts being made from remote locations, RCA also set up a remote pickup site 1 mile from the studio.

The initial test broadcasts were made using a 49 MHz signal for the video together with a 50 MHz signal for the audio portion. This choice of frequencies allowed the use of a single receiver with an rf tuning system of sufficient bandwidth to accommodate both the audio and video signals. A single local oscillator then created two IF signals.

The resolution of the 240 line images transmitted was considered only "satisfactory." Fortunately, both the Kinescope and Iconoscope tubes inherently had better image resolution capabilities than did the rest of the transmitting and receiving systems. This meant that with only fairly simple circuit modifications, RCA was able to increase the resolution of the experimental broadcasts to 343 lines by 1934.

The testing and improvement of RCA's all-electronic television system continued for several years. By this time, RCA had a large staff working to make television a commercial reality. An improved television camera tube called the "Orthicon" was developed at RCA in 1938 by Harley Iams and Albert Rose. The Orthicon was based on many of the same principles developed by Zworykin for the Iconoscope.

On April 30, 1939, RCA began its commercial television broadcasts in New York City with a telecast of President Roosevelt speaking at the

opening of the New York World's Fair. Some 100 to 200 receivers located within a fifty mile radius of NYC enabled approximately 1000 viewers to watch this historic telecast. In the beginning, RCA offered 25 hours of broadcasts per week. Films, plays, and sporting events were the main features of these telecasts.

Television receivers produced by RCA and by three other manufacturers were available for purchase at Macy's Department Store beginning in May of 1939. These receivers had viewing screens ranging from 5 inches to 12 inches in diameter and were available at prices of 200 to 600 dollars [18]. This was a substantial amount of money in the days when the minimum wage was 25 cents per hour.

Farnsworth's Contributions

Zworykin's work was crucial to RCA becoming the dominant force in American television during the period that extended at least through the 1960s. It would be wrong, however, to identify Zworykin as either the "*father*" or as the "*sole inventor*" of all-electronic television. Throughout the period when Zworykin was developing his ideas, others were pursuing the same goal and making significant contributions to all-electronic television technology.

Philo T. Farnsworth is particularly noteworthy as another creative visionary who made many significant pioneering contributions to the development of all-electronic television during the same time period as did Zworykin. Endowed with near-genius ability, Farnsworth reportedly first outlined his goal and initial concepts for all-electronic television in 1922 while still a student in high school. Due to his intensive self-study of numerous topics outside the normal high school curriculum, Farnsworth already was familiar with many topics in modern physics.

Further attesting to his abilities and dedication of his work and is the fact that the need to attend to family responsibilities allowed Farnsworth to pursue only two years of college level studies. He had to teach himself virtually all the science and applied technology needed to develop his television system.

Farnsworth pursued his goal relentlessly, with neither the massive financial backing nor the substantial support staff that Zworykin enjoyed at Westinghouse and at RCA. To obtain needed financing, Farnsworth had to convince bankers and others repeatedly of the soundness of his ideas.

Philo Farnsworth applied for his first television patent in 1927. The patent was awarded in 1930. This patent would become crucially important in later legal battles with RCA.

Farnsworth later developed and patented many more important innovations related to television.

In 1928, Farnsworth demonstrated to a group of newspaper reporters a crude electronic television system that showed the feasibility of his concepts. These initial images were blurry and of poor contrast but were displayed at a rate of 20 frames per second. This was sufficient to convey to the observer the sense of watching continuous motion.

By 1934, Farnsworth's continued hard work had resulted in an all-electronic television system of a quality which was similar to that achieved by Zworykin. In that year, Farnsworth set up his television system at the Franklin Institute in Philadelphia for a ten day period to demonstrate his television system to the public and to make experimental television broadcasts.

Not surprisingly, there soon were patent disputes developed between Farnsworth and RCA over who had established priority for the concept of an all-electronic television system. This matter was critically important because the one judged to have priority could demand royalties from anyone else seeking to market an all-electronic television system. The issue boiled down to whether or not Zworykin's 1923 patent application established that priority over Farnsworth's 1927 patent application.

The legal battles continued until 1936 when the Board of Appeals of the United States Patent Office ruled in favor of Farnsworth. The Board decided that the system Zworykin had described in his 1923 patent application not only did not work; it could not work as described. Farnsworth was declared to have priority on the concept of all-electronic television.

It should be emphasized, however, that this patent ruling dealt only with the issue of *priority of concept* with regard to all-electronic television. The later patents for Zworykin's Kinescope receiver and Iconoscope transmitter were not at issue.

In 1939, an agreement was reached whereby RCA agreed to pay Farnsworth one million dollars over a period of ten years to use the important television patents developed by Farnsworth. The victory, however, was a hollow one for Farnsworth.

Philo Farnsworth had been devastated, both financially and emotionally by the dispute. In addition, World War II brought a temporary halt to the further development of commercial television.

It is charged by some that Sarnoff deliberately had used the massive resources of RCA in an attempt to destroy Farnsworth's ability to compete commercially by prolonged legal wrangling. For many years, Philo Farnsworth's name and work

were all but forgotten.

Those interested in learning more about Farnsworth and his achievements are urged to read some of the comprehensive works available on his life and technical achievements [19, 20, 21, 22, 23].

Author's Note: All photographs relating to Vladimir Zworykin's work are courtesy of the David Sarnoff Library, Princeton, NJ. Particularly helpful in obtaining the illustrations was Dr. Alexander B. Magoun, Executive Director of the David Sarnoff Library. The URL for the Sarnoff Library's website on the history of television and other topics related to RCA is Philo T. Farnsworth is courtesy of Kent M. Farnsworth, Philo's son. Kent Farnsworth maintains a very interesting and informative website on his father's work. The URL is www.philofarnsworth.com.

REFERENCES

(References 1 through 13 were listed in Part I of this article.)

14. Unsigned Article, "Zworykin's Iconoscope," *Electronics*, July, 1933, p. 188.
15. Peck, A.P., "A New Cathode Ray Tube," *Television*, August, 1933, pg. 283.
16. Unsigned Article, "'Mosaic' Television for the Home," *Popular Mechanics*, September, 1933, pg. 321.
17. Zworykin, V.K., "The Iconoscope) A Modern View of the Electric Eye," *Proceedings of the IRE*, January, 1934, pg. 16; reprinted in *Proceedings of the IEEE*, August, 1997, pg. 1327.
18. Burns, R.W., *Television—an international history of the formative years*, Institution of Electrical Engineers, London, 1998.
19. Farnsworth, Elma G., *Distant Vision – Romance and Discovery on an Invisible Frontier*, Pemberly Kent Publishers, Salt Lake City, UT, 1990.
20. Everson, George, *The Story of Television*, W.W. Norton & Co., New York, 1949.
21. Godfrey, Donald G., *Philo T. Farnsworth – The Father of Television*, The University of Utah Press, Salt Lake City, 2001.
22. Schatzkin, Paul, *The Boy Who Invented Television: A Story of Inspiration, Persistence and Quiet Passion*, Teamcom Books, Silver Spring, MD, 2001.
23. Schwartz, Evan I., *The Last Lone Inventor: A Tale of Genius, Deceit, and the Birth of Television*, Harper Collins Publishers, New York, 2002.

KEY AND TELEGRAPH

EDITED BY **JOHN CASALE**, W2NI, 3 PICKERING LANE, TROY, NY 12180
PLEASE INCLUDE SASE FOR REPLY. © 2004, J. CASALE



Centennial of the Martin Vibroplex

This spring marks the one hundredth anniversary of the commercial introduction of the Vibroplex. I thought it would be appropriate at this time to document in more detail the activities of Horace G. Martin for the months and years leading up to this introduction. In particular, his undocumented experiments that ultimately developed into the Vibroplex. You might be interested to learn that in 1902 he gave his attorney patent drawings for an all-mechanical transmitter that were never filed.

In 1900 Martin, then 27 and still working as a telegrapher, established his first shop at 75 Nassau St. in New York City. He formed a partnership with fellow telegrapher, 29 year old Thomas J. Dunn, operating as the Dunn-Martin Electric Company. Together they did electrical contract work and built a medical shock device for the treatment of telegraphers suffering from “telegrapher’s paralysis.” During this partnership, Martin was working separately on self-adjusting relays and various automatic telegraphy projects including the Phillips Automatic Telegraph System and a typewriter-like keyboard transmitter.

One of Martin’s earliest experiments with a “semi-automatic” transmitter was done at the Nassau St. shop. The instrument used two ordinary Morse keys—one for sending dashes, the other for sending dots. The “dot” key controlled a circuit consisting of a pair of electromagnets and a local battery. The armature on the electromagnets was connected to a long flexible pendulum. This was Martin’s first experiment using a pendulum and he already knew that he could set it into vibration by moving it against a stop with his hand.

When the “dot” key was pressed, the armature pulled the pendulum against the magnet’s cores where it was stopped abruptly, causing it to go into vibration. A contact on the pendulum opened and closed a circuit until the armature was released. The speed was varied by placing an ordinary bind-

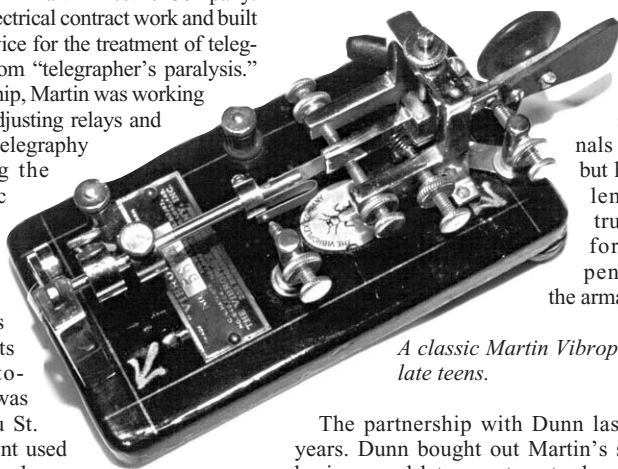
ing post at different positions on the pendulum.

To send the letter “B” one closed the “dash” key first, then quickly pressed the “dot” key allowing the pendulum to generate three dots. Releasing the “dot” key caused the armature to drop and the pendulum was then arrested.

Martin conducted tests of this transmitter on the press wires of the *New York World*, where he was working as a telegrapher. He was particularly concerned with the “carrying” capabilities over long lines. The facilities at the *World* gave him excellent opportunities to test all kinds of telegraph transmitters.

He generally conducted his tests on the St. Louis wire in the middle of the night (around 4:00

a.m.) after he came off duty. His transmitter produced strong signals to St Louis but he had problems with the trunnion seats for both the pendulum and the armature.



A classic Martin Vibroplex from the late teens.

The partnership with Dunn lasted for two years. Dunn bought out Martin’s share of the business and later went on to develop his own semi-automatic transmitter called the Dunduplex. The model of Martin’s early experiment was kept by Dunn in box of junk from the Nassau Street days and still existed as of 1906.

In early 1902, Martin moved to Bridgeport, Connecticut to work as an assistant to Walter Phillips at the American Graphophone Company. He continued his telegraphy experiments at his residence in Bridgeport and developed his first commercial transmitter, the Autoplex. In September, he moved back to New York and rented shop space from Max Sanger, a model maker, located at 62 Cortlandt St.

Martin filed for a patent on the Autoplex on

October 6th of that year and, with Sanger's help, built and sold "several dozen" Autoplexes from the Cortlandt St. address. The Autoplex was reasonably successful, but was known to the telegraph fraternity as the "battery machine" because of its dependency on a local battery to drive its electromagnets. Almost immediately after filing for this patent, Martin started to experiment with ways to substitute some kind of mechanical motor for the electromagnets. On November 13, 1902, Martin sent patent drawings for a new all-mechanical transmitter to A.M. Wooster, his Patent Attorney, in Bridgeport, Connecticut. Martin wanted him to apply for a new patent, as an improvement on his Autoplex, as soon as he could come up with the necessary funds.

During the time he was developing these instruments, Martin was not always in a financial position to take out patents on every improvement, even with help of Walter Phillips. He asked Wooster how much it would cost to file for a caveat and/or a second patent. Wooster advised him not to waste his money on a caveat and just patent the invention but it would cost Martin about \$85.00.

Referring to Martin's handwritten drawing shown here, the shaft of a toothed wheel is turned by any suitable means, such a spring motor or kicks from a clock's pendulum. The wheel is held in restraint by the key lever. Pressing the lever to the right releases the wheel permitting it to turn.

The teeth of this wheel push a contact spring towards a fixed contact to produce dots. Pressing the lever to the left stops the wheel and further pressure extends the flexible portion of the lever causing the circuit to close for the duration of a dash. A model of this key was built in early 1903 but was unfortunately not preserved. Martin tried two other ways to produce dots while at Cortlandt St. One method used a clock mechanism with a pendulum; the other used a flywheel.

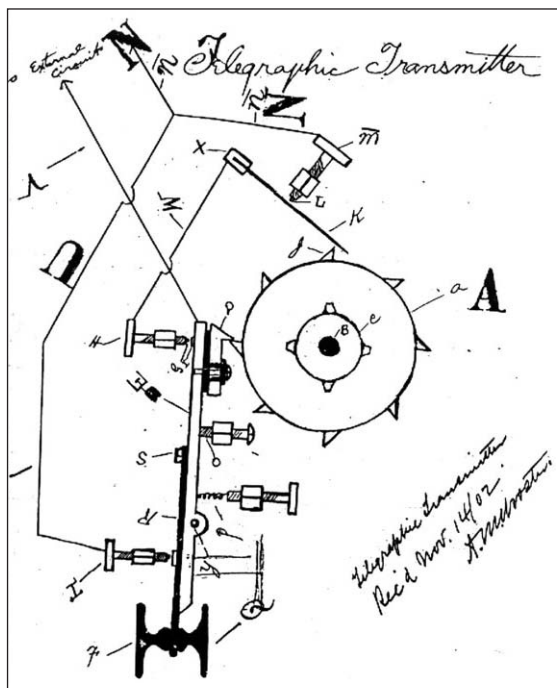
He originally purchased an enclosed clock movement from Sanger with hopes of incorporating it in his Autoplex. But in early 1903 he used it in a separate model where a pendulum was driven by the escapement of the clock. When the clock mechanism was set in motion, the escapement caused the pendulum to oscillate back

and forth opening and closing a circuit producing dots. He placed a weight at various points on the pendulum to see if the it would produce firm signals at a uniform rate of speed. He also tried substituting a small toy hot air engine for the clock, but had problems with overheating.

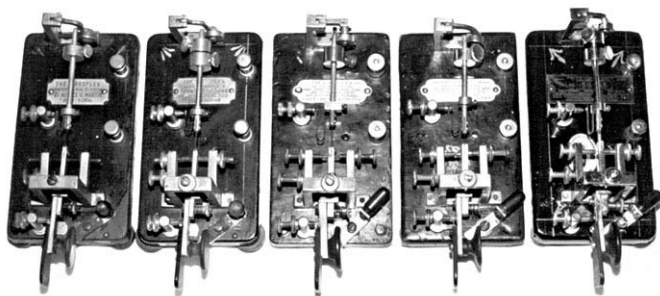
In another experiment, Martin mounted a small ratchet wheel on the same shaft with a flywheel. On one end of a centrally pivoted key lever were finger keys. On the other end was a rack which was normally held out of engagement of the ratchet wheel. Moving the lever to the right engaged the rack with the ratchet wheel causing the flywheel to spin. The shaft had a contact that opened and closed the circuit as it spun around. Martin conducted several experiments with these principles, using parts from one instrument to build another.

In a second letter to Wooster dated Nov 29, 1902, Martin says he is "swamped in getting things going." What is notable in this letter is that Martin makes mention of developing a "Wireless Telegraph System." Wooster had asked Martin how the system was going and was very interested in learning more about wireless technology.

Martin's reply was, "I expect to take up the



Martin's never-filed 1902 patent drawing for an all-mechanical transmitter.



Samples of the basic design, later called the "Original Model," changed little over the years. Here, left to right, are representatives from the years 1905-1920.

system again in the near future and should I have a little luck in conjunction with a very pretty theory I suppose we will have to call on the patent office again." (He experimented for many years with wireless but no patents were issued.)

Martin worked at Sanger's shop until June of 1903, and in addition to building the Autoplex and conducting his experiments, he was perfecting the Phillips System and doing general electrical work such as repairing and wiring. He then moved his shop to 53 Vesey St. where he continued his experiments while still working as a telegrapher.

1904 was a critical year for Martin as an inventor. In February, the United Electrical Manufacturing Company was formed as a organized effort to market the Autoplex. Martin became the general manager of both sales and manufacturing and his 53 Vesey St. shop was upgraded.

In the months preceding the formation of UEM, Martin was preoccupied with his experiments and failed to anticipate the competition that was forming. In January of 1904, William Coffe, a telegrapher from Ohio, filed for a patent for an all mechanical, motorless transmitter called the Mecograph.

In April of 1904, Martin inspected two transmitters manufactured by the Mecograph Company at their dealer's store in New York City. There were two Mecographs on display. One had a vertical pendulum, and the other had a horizontal pendulum "contained in a small metal case." Both were marked "patents pending."

The following month, on May 7, 1904, Martin filed for his second transmitter patent as an improvement to his Autoplex. The patent included one design for an all-mechanical, motorless key. It was granted on August 9, 1904. (767,303). However, Coffe's earlier filing date would come back to haunt Martin.

Even though Martin is credited with inventing the art of semi-automatic telegraphy with his Autoplex, Coffe gets credit for inventing the first all-mechanical motorless key. Martin was later criticized by Mecograph on the grounds that this

August 9th patent was a "paper patent;" no practical instrument was ever produced from it. He was accused of hastily putting it together after seeing the two transmitters at Mecograph's dealer store in New York.

Also, they thought the patent was granted quickly because of the limited scope of claims (just three) made by Martin in his application. Martin's patent called for a lever that released a restrained vibrator to produce dots in a similar manner to the technique described in the Coffe patent. However, Martin's one-piece lever was productive in two directions; moving it to the right produced dots and to the left a dash.

In Coffe's patent, the lever was productive in only one direction—to the right for dots. A separate dash lever made out of a leaf spring was attached to the side of the main lever. The operator pressed this lever to the left against the main lever to produce a dash. The patent office, and subsequently the courts, ruled this small difference in Martin's design "exhibits a patentable invention."

Martin used the period from August 1904 to early 1905 to develop these ideas into the product that would become the Vibroplex and to prepare UEM's factory for its introduction. In a later lawsuit between UEM and the Mecograph Company, Martin's lawyers stated that the Vibroplex was not manufactured until "some time in 1905."

This is also evident in the trade publications for the period. One week after Martin was granted his August 9th patent, a small business sketch about him appeared in *The Telegraph Age* on August 16, 1904. It credits Martin with receiving patents and highlights the Autoplex, but there was no mention of a new mechanical transmitter.

In January of 1905 UEM was still advertising the Autoplex and making no mention of the Vibroplex. On May 16, 1905, in another business notice, UEM announced the enlargement of its operation at 53 Vesey St. "owing to pressure." Two large lofts in the building were now devoted to manufacturing.

Among the products listed in the notice were the Martin Autoplex and, for the very first time, the Martin Vibroplex. An invitation was also extended to inspect UEM's products at the Railway Telegraph Superintendents Convention to be held on May 17th at the Read Hotel in Chattanooga, TN (a major trade show).

Published convention reports show that a Martin Vibroplex was on exhibit and was "carefully looked into by all interested." This appears to be the very first public showing of the Vibroplex. UEM and at least one of their agents began advertising the Vibroplex the following month. Martin later filed for a patent that is truly representative of the Vibroplex on April 16, 1906.

The labels on his early production models of the Vibroplex were stamped, "Patented August 9, 1904." The courts would later agree with Martin's reasoning for doing this stating, "we are of the opinion that Martin conceived the particular instrument shown in the patent (August 9, 1904) and reduced it to practice before he began to manufacture it for sale."

Horace Martin's Vibroplex affected the careers of thousands of telegraphers and radio op-

erators for decades and is used, admired, and available today. Considering the endless stream of treasures from the attics of America showing up on Internet auctions, it seems likely that examples of the Martin Vibroplex will still be around for the product's Bicentennial. 

SOURCES

National Archives and Records Administration
New York, N.Y.: U.S. Circuit Court of Appeals,
Second Circuit

Horace G. Martin vs William Wall," Files
#3067, Oct. 1907 and

Benjamin F. Bellows vs United Electrical Manufacturing Co.," Files # 3068, Jan. 1908

U.S. Patent 812,183, William Coffe, Feb. 13, 1906

U.S. Patent 767,303, Horace G. Martin, Aug. 9, 1904

Letters, H.G. Martin and A.M. Wooster, Nov. 13 & 29, 1902.

Casale J., Sources for "A Vibroplex in Every Telegraph Office," *The OTB*, May 2003.

About Our Authors

DAN MERZ

*Building a Replica Magnetic Detector
(In "Breadboarding")*

Dan graduated from Stanford in metallurgical engineering in 1961. He then received a M. Met. degree from Sheffield University, England. Later, he returned to Stanford for a doctorate in Materials Science. Dan subsequently spent two years at University of California, Berkeley, doing research on high strength steels. He retired from Battelle Pacific Northwest Laboratories in Richland, WA, where he worked on plutonium metallurgy and vacuum sputtering of advanced materials. Dan's radio interest started with SWLing on the family Philco console. He has seriously collected and repaired old radios for about 20 years. The collection now numbers about 200, including early battery sets, crystal sets, boat anchors, and regenerative shortwave sets as well as an assortment of 30s radios. Dan is a member of the Puget Sound Antique Radio Association in Seattle.



ROBERT MURRAY

Re-Creating Reginald Fessenden's Liquid Barretter
Robert retired recently as Professor, Commu-

nity Health Sciences, University of Manitoba, but still keeps his hand in. Note the absence of any link to the electronics industry. His hobby career in antique radio follows a more or less typical series of evolutionary stages. He began about 25 years ago by collecting almost everything in sight. After a decade or so he decided to focus his collection on Canadian-made broadcast receivers of the 1920s. Three years ago he donated the Canadian items in his collection to Canada's National Science and Technology Museum. His acquisitions have now slowed to a trickle, and he directs his attention to documentation of the history of early Canadian radio manufacturing and related topics. The next phase will be...



BOB RAIDE, W2ZM

A Simple "MOPA" Adapter for the 1929 QSO Party

Bob has held an amateur radio license since the age of 13. He has also had a long-time interest in broadcasting and earned a First Class Phone ticket at age 16. Now, at age 60, he enjoys the hobby and the broadcasting business as much ever. Though retired from the family business as of last year, he remains in broadcasting with a capable partner. He operates in three upstate New York markets: Syracuse, Utica, and Al-

bany. Bob built, owned and operated an AM station licensed to Penn Yan, NY and an AM/FM combo in Sidney, NY, since sold. He remains active in amateur radio and the AWA (member since 1974), and is a member of the Radio Club of America. Bob says that working with other AWA members on various historically related projects has made his radio hobby and business a never-ending adventure.



JAMES P. RYBAK, W0KSD

Vladimir K. Zworykin's Contributions to the RCA Electronic Television System: Part 2—The Iconoscope
James Rybak was born in Cleveland, Ohio in

1941. He has been interested in both radio and electronics, first as a hobby and then as a profession, for over 40 years. Jim holds B.S., M.S., and Ph.D. degrees in electrical engineering as well as Extra-Class amateur radio license W0KSD. He teaches engineering and mathematics at Mesa State College in Grand Junction, Colorado. In recent years, Rybak has published numerous articles in the U.S. and abroad on the history of both wireless and electrical technology. When not writing articles, he spends his free time trying to achieve "Worked All States" through the low-earth-orbit amateur radio satellites as well as trying to become knowledgeable about digital photography and slow-scan television. 

SILENT KEYS

We record the passing of the following AWA members with deep regret.

ANTHONY WAYNE BEEVER, W0NHK, 80, (8-4-04) lived in Palmyra, MO.

MURIEL ISABELLA LOCK, 98, (12-9-04) lived in Croydon, England and made her first visit to America in 1988 to attend the AWA conference in Canandaigua and continued coming to the meetings each year through 2000. Her first job was working with a portrait photographer in 1925. From 1930 to 1939 Muriel was a purchasing agent to a general manager of an accounting and tabulating machine firm. During WWII she worked as a traveling projectionist (16mm equipment) showing Ministry of Information films to employees in munitions factories to boost morale. After the war Muriel worked for the police as a teleprinter and telephone operator. (Thanks to Bart Lee, KV6LEE, and Alan Carter). See also "letters" column in this issue.

DAN MASON, (9-04) lived in Santa Fe, NM.

FRANK Q. NEWTON, JR., W6SYG, (ex-W9AJE), 83, (11-8-04) performed electronic assembly and testing for the William Miller

Corporation and Applied Physics Corporation during the 1940s. He worked for Consolidated Engineering Corporation for twenty years and during the late 1950s was named a Senior Sales Manager. The firm, founded and owned by Herbert Hoover, Jr., W6ZH, later became Consolidated Electrodynamics Corporation. Newton later left the firm to join several associates to work on hybrid microcircuits, printed circuits, direct current amplifiers and space hardware for Jet Propulsion Laboratories. Newton lived in Alhambra and was an active member of the Southern California DX Club particularly during the early 1960s. (Information obtained from letters written to the writer)

JOYCE PECKHAM (11-04) had been the long time Secretary of the AWA until last fall when she resigned her position for health reasons. She was named Secretary Emeritus of the Antique Wireless Association by the Board at their November 14, 2004 meeting. Joyce was married to AWA ex-president and long-time board member Lauren Peckham. A more complete memoriam to Joyce will be found in this issue on page 58.

Note: AWA officers and members are being asked to submit all information about Silent Keys to Pat Muehlbauer, P.O. Box 108, Stafford, NY 14143. This will help in the collection and coordination of information and appropriate recognition of both AWA members and others who have made contributions to the electronics and entertainment industries.

NEW BOOKS AND LITERATURE



DAVID W. KRAUTER, 506 E. WHEELING ST., WASHINGTON PA 15301. E-MAIL: KRAUTER@EARTHLINK.NET.
PLEASE INCLUDE SASE FOR REPLY.

Books to be reviewed in this column should be sent directly to David Krauter at the address above. After review, all such books become a permanent part of The AWA Library, which is part of The AWA Electronic Communication Museum and is available to members for browsing and research.

Communications: An International History of the Formative Years

By Russell W. Burns. (*IEE History of Technology Series 32*). Published 2004 by the Institution of Electrical Engineers, 6 x 9 1/4 inches, 639 pages, softcover, \$95.00.

Anyone seeking an in-depth introduction to the subject of communication by electromagnetic waves would do well to consult this volume. It is hard to believe that just one man wrote this thick book. Burns achieves his goal by relying heavily on secondary sources, many of which are his own. (He is the author of four other books in the IEE series). Though some of the information here can be found in other sources, Burns provides a valuable service in bringing it all together in one comprehensive compilation and interpreting it.

He begins his big history with a chapter on communications among the ancients. There follows a chapter on the instrument which led (he coyly but correctly claims) to the "first practical, long range, communication system using electromagnetic waves"—the telescope.

Three examples will show the depth of detail in the book. We are told on page 146 that in his attempts to finance a telegraph cable between Europe and America in mid-19th century Cyrus Field crossed the Atlantic Ocean 64 times, getting seasick each time.

One probably wouldn't expect to find a photograph here showing the primitive but effective "method of releasing a carrier pigeon from a porthole in a [World War I military] tank," but there it is on page 409. (We can assume this photograph is no longer classified.)

A further example is the "Summary of the proposals made during the period 1911-1930 for electronic television cameras using cathode-ray tubes." This seven-page table lists no fewer than 22 such proposals from five countries, with descriptive details for each.

Burns interprets "formative years" in his subtitle broadly. So we have a chapter on high definition television (meaning CRT television) and a

chapter on radar. AWAers may be most interested in the chapters "The birth of sound broadcasting," "Some important developments in the 1920s," and "The rise and fall of low definition [mechanical] television."

Our only complaint is about the reproduction of some photographs from other publications. The details in some of these are so tiny as to border on the unreadable.

This book is something like a great accomplishment; it makes informative reading.



Bret's Old Radios Presents: Antique Radio Restoration: Vol. 1: A Step-By-Step Video Guide to Old Radio Repair, 2001, 1 hour and 50 minutes. Vol. 2: Intermediate to Advanced Theory and Troubleshooting, 2004, 2 hours and 18 minutes.

Narrated by Bret Menassa. Produced by Mike Camerata. Available in VHS or DVD formats, in color, from bretsoldradios@att.net or visit www.bretsoldradios.com. \$34.99 each cassette and \$39.99 each DVD, or \$49.99 for both cassettes and \$59.99 for both DVDs.

If you've been thinking about trying to restore some of your old radios but have hesitated because you "don't know electricity," these two videos would be a good place for you to start.

Bret Menassa, looking very much like everybody's uncle in his casual dress and with his gorgeous collection of radios in the background, talks and walks the viewer through old radio repair in a very laid-back informal style, assuming at the outset that the viewer knows nothing about the subject. He begins with such rudimentary lessons as knob, tube and chassis removal and cleaning methods.

Before the radio gets plugged in he shows how to change the filter capacitors (they are assumed to be defective without testing) and gives a very basic talk on tube operation theory. Only at that point is the radio turned on. Much to Menassa's credit, he chose his demonstration radio—a 1936 Philco Model 640—without

knowing beforehand what its operating condition was.

Those who already know the stuff that Menassa covers to this point may still gain much from this video for he then spends considerable time on cabinet repair and restoration. We are glad to see that he does not strive for perfection—in fact all his cabinet restoration work avoids refinishing, *i.e.*, lacquer removal or stripping. The results he obtains using only such products as oil soap, 000 steel wool, mineral spirits, gel stains and “blush eraser” are stunning enough to make one want to have his own 640.

One is tempted to recommend that the viewer spend some time with a basic electronics text before viewing volume II. It goes into much greater depth in circuit analysis and troubleshooting methods. Menassa obviously is highly motivated in his desire to pass along his enthusiasm and knowledge to the viewer.

It is very ambitious (some would say foolhardy) to attempt to describe in just a few minutes such complex topics as capacitance, resistance, inductance, heterodyning, etc. in a way understandable to the neophyte. Engineers and electronics professionals will grimace at some of these explanations, particularly when they encounter such phrases as “soaks up the voltage.” But of course engineers are not the videos’ intended audience, and the motivated beginner can learn much from both videos.

Volume II ends with a detailed demonstration of a.m. radio alignment procedure using a signal generator. This is done by ear (no meter is used) and is an adequate method for the small table radios featured in the videos. Some detail should have been given about the connection between generator output and radio input.

These two videos represent an enormous investment of time and thought on the part of the narrator and producer. They are a viable alternative to the many available books and magazine articles covering the same material. Highly recommended to the wandering novice, and others as noted.



Origins of the Vacuum Tube: An October 1964 Talk by G. F. J. Tyne

Audio CD produced 2005 as Tube Collectors Association Special Publication No. 9. With a 30-page booklet of photographs. Free with a subscription to TCA. Visit www.tubecollectors.org. Questions to tubelore@jeffnet.com or call 541-855-5207.

Tyne’s 1964 talk, introduced by Bruce Kelley,

begins with the 1853 work of A. E. Becquerel and ends with the Moorhead/de Forest tubes made just after the first World War. Tyne had original early tubes present at his talk, including some Edison-effect lamps and Fleming diodes. The audio of his speech makes evident his somewhat annoying verbal habit of starting a phrase or sentence several times before finishing it. Fortunately the habit did not carry over to his authoritative book, *Saga of the Vacuum Tube*, respected by collectors and historians.

The booklet contains black-and-white photographs time-keyed to Tyne’s near-hour-long talk. Also included is a unique two-page table listing Western Electric developmental tube specifications.

Thanks to Jerry Vanicek for transcribing the original tape recording and producing this convenient, historical CD.



The Man Who Changed Everything: The Life of James Clerk Maxwell

By Basil Mahon. Published 2003 by Wiley, www.wiley.com, 5¼ x 8¾ inches, 226 pages, hardcover, \$27.95.

“One scientific epoch ended and another began with James Clerk Maxwell.” Thus spoke Albert Einstein and this short, very readable biography shows why. Maxwell was born in 1831 and died of intestinal cancer in 1879. In between he managed to, well, change everything. As a boy of three he demanded to know how things worked, pestering his parents with his standard question, “What’s the go o’ that?” (Isn’t it nice that Maxwell’s exact words as a three-year-old boy appear in the *AWA Journal* 170 years later?) By his early 30s he knew how things worked and propounded his theory of electromagnetism. His four formulas (tamed by Oliver Heaviside) are still in use by electrical engineers.

The seminal theoretical truth that Maxwell laid down in 1864, however, was not completely accepted until years after his death. Indeed, Mahon points out that even the great Lord Kelvin, who lived until 1907, probably never did understand Maxwell’s electromagnetic theory. But in Germany Hermann Helmholtz encouraged his student Heinrich Hertz to investigate further. Hertz was so successful that “Eight years after his [Maxwell’s] death, Maxwell’s electromagnetic theory had been emphatically verified.”

Maxwell enthusiasts (if not outright worshippers) are called Maxwellians¹. They may be saddened to learn that he was not perfect. Mahon reports that Maxwell was notably lacking in some

lecture skills and was known for making relatively simple errors in his calculations. Nevertheless his thinking was profound, and we get some idea of Maxwell's posthumous scientific stature from this part of Heaviside's famous assessment of him: "His soul will live and grow for long to come, and hundreds of years hence will shine as one of the bright stars of the past, whose light takes ages to reach us." ☐

¹. For more on Maxwell's belated rise into scientific superstardom, see Bruce J. Hunt's *The*

Maxwellians (Cornell, 1991).

ALSO NOTED

Amir D. Aczel, *Pendulum: Léon Foucault and the Triumph of Science*. Atria Books, 2003, 275 pages.

Bill Bryson, *A Short History of Nearly Everything*. Random House, Inc., 2003, 544 pages.

Frank T. Kryza, *The Power of Light: The Epic Story of Man's Quest to Harness the Sun*. McGraw-Hill, 2003, 298 pages.

JOYCE PECKHAM 1937-2004

SECRETARY OF THE ANTIQUE WIRELESS ASSOCIATION 1988-2004

By Bruce Roloson, Dick Ransley and Nancy Ransley

Just before Thanksgiving, 2004, Joyce Peckham became ill and passed away. This was a tremendous loss to her husband Lauren and their family, as well as to the Antique Wireless Association.

Joyce was born in Rochester and raised in Sodus, New York, a small rural community on the shores of Lake Ontario. She was valedictorian of her class and went on to graduate magna cum laude from Elmira College, certified to teach high school mathematics and biology.

She married Lauren Peckham, her high school sweetheart, in December of 1958. They became the parents of two boys, David and Kent, and eventually the grandparents of four.

Joyce taught math at Horseheads High School. In succeeding years, Lauren and Joyce established and grew a successful family business. She has been active in the Horseheads Methodist Church and for many years has been actively involved in the AWA as secretary and membership chairman.

Joyce was always willing to step in to help solve any AWA problem. She was the longest-serving secretary and officer of the organization. Joyce added a voice of experience and reason to the discussions of challenges that faced



the organization over the years.

Members came to know her in her capacity of volunteer Membership Chairman. She received all the dues payments, tracked all records, prepared all foreign and Canadian mailings, and organized the mailing of *The AWA Journal*. This required the ordering of supplies, tracking mailing permits, obtaining and applying postage, sending out dues reminder notices, and answering letters, phone calls, faxes and e-mail messages. Joyce would also provide mailing labels for other AWA events.

For as long as we can remember, Joyce and Lauren manned the AWA booth at the Rochester Amateur Radio Association Hamfest. This booth provided exposure for the AWA, attracted new members, and represented the club in a very positive manner.

Joyce planned and coordinated our two joint meetings with the British Vintage Wireless Association in London. While Lauren was president of AWA, she took care of many of the planning needs of the annual conference and added her personal touch by initiating a Silver Tea for honored guests and conference workers.

Joyce's energy, warm smile, and many contributions are so woven into the fabric of AWA that we will always feel her influence. She will be sadly missed.

THE VACUUM TUBE

EDITED BY **LUDWELL A. SIBLEY**, 102 MCDONOUGH RD., GOLD HILL, OR 97525-9626

PLEASE INCLUDE SASE FOR REPLY. COPYRIGHT © 2005 LUDWELL A. SIBLEY.



The Pencil-Tube Line

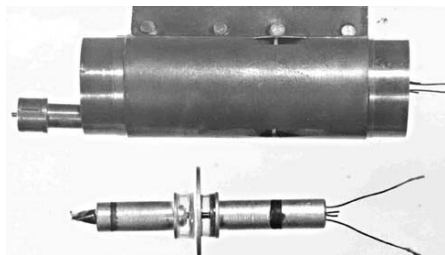
This is a continuation of the January's "The Vacuum Tube" column, presenting the table mentioned in the January column and additional pencil tube photos—ed

All heaters are 6.3 V except for radiosonde types 5794, 6562, and 7533. Electrical ratings shown are heater current, I_h , in mA; amplification factor, μ ; plate dissipation rating, P_d , in watts; max. freq. for use at full ratings, F_f , in GHz; and max. freq. for operation at any rating, F_{max} , in GHz. Numbers in brackets (e. g., {A15122}) are developmental items. Dates in parentheses are those of final EIA registration.

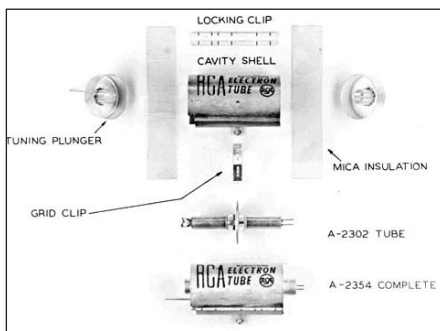
REGISTERED GLASS TUBES

5675 First of the line; osc. or amp. {A2352} (11-15-49) I_h 135, μ 20, P_d 5.0, F_f 1.7, F_{max} 3.0.

5876, A 5675 re-grided for μ of 56 {A2351}



Early version of A2354 radiosonde oscillator for 1.68 GHz.



5794 (ex-A2354) commercial radiosonde oscillator.

(6-9-50). P_d uprated to 6.25. As CW osc., gives 1 W @ 1 GHz or 0.1 W @ 3 GHz.

5893 5675 with heavier (330 mA) heater for pulse use {A2317} (10-5-51); μ 27, P_d 5.0, f_{max} 4.0. As plate-pulsed osc., gives 1.4 kW peak output @ 1 GHz or 800 W @ 3.5 GHz. As CW osc., gives 10 W at 0.5 GHz or 1 W @ 2 GHz.

6173 Diode, essentially a gridless 5675 {R6373C} (11-21-52).

6263, A Finned-radiator version with re-designed anode {A2465} (11-20-53). I_h 280, μ 27, P_d 8, F_f 0.5, F_{max} 1.7. As CW osc., gives same power as 5893.

6264, A 6263 regrided for μ of 40 {A2466} (11-20-53).

6407 Ruggedized pulse type {A2467B}, dev. for Signal Corps in 1955; withdrawn soon after. Used cathode and anode of 5893, and heater of 6263.

RCA-NUMBERED GLASS VARIANTS

4037, A Octal-based, lower-cost versions to replace 2C40 and 2C40A respectively {A15275} (1962). Have oversized grid ring and cathode shell to match 2C40 resonators. I_h 140 mA, P_d 6.25, F_{max} 1.7. 4037 has plastic encapsulation around body and μ of 56, vs. 30 for "A." Either tube is usable to 100,000 ft.

4042 5675, specially aged and tested for Hewlett-Packard, HP Part No. 1921-0001.

4043, V1 5876A, specially aged and tested for Hewlett-Packard, HP Part No. 1921-0003. "V1" has long leads, for soldering to A15xxx assemblies.

4058 5893 re-grided for μ of 40 (1965); I_h 300, P_d 7; F_{max} 7 for CW or 4.0 for pulses; gives 800 W pulse output at 3.3 GHz. Also usable as series voltage regulator or pulse modulator.

4076 4058 with hole in grid disc.

A15094 Class-C amp.; data unknown.

A15104 Low-noise Class-A amp.; data unknown.

REGISTERED CERAMIC TUBES

7552 Intended as Class-A RF amp. (10-19-59); I_h 225, μ 70, P_d 2.5, F_{max} 1.0 (later 1.5). Gave slightly higher noise figure (8.5 dB) and more power gain (18 dB) at 0.8 GHz than 7553.

7553 Intended as Class-A RF amp {A15123} (2-15-60). Same as 7552 except for μ of 80. Noise

figure 7 dB and gain 17 dB at 0.8 GHz. $F_{\max}$ 1.0 (later 1.5).

7554 Intended for Class-C RF use. The 7552, with ratings unchanged, but characterized for power use (10-29-59). F_f 1.0 (later, 2.0); $F_{\max}$ 3.0 (later, 5.0).

8727,V1 7554 with redesigned bulb and shortened anode {A15559} (7-31-67). Same electrical specs. "V1" is selected,

RCA-NUMBERED CERAMIC VARIANTS for use in 4083 assembly.

4014 Ruggedized type {A15122} (1960), probably ceramic. Sold to Bendix Corp. and Sandia Labs. Some tubes were branded "SRC SA738." Other data unknown.

4022-24 Types for S-band use (2.85-2.95 GHz). Made in single production lots in 1962, then withdrawn. Other data unknown.

4022 Cathode-pulsed osc. {A15134}.

4023 Plate-pulsed osc. {A15135}.

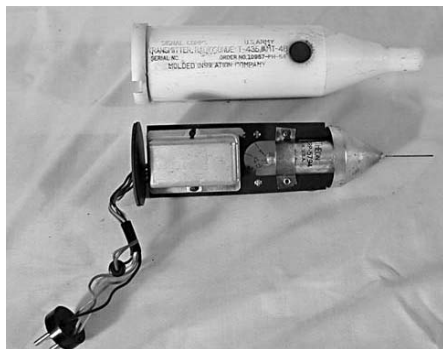
4024 Modified plate-pulsed osc. {A15136}.

4027 Ceramic type, from same development as 4024 {A15136} (1961). Sold only to Avco-Crosley and U. S. Govt. Other data unknown.

4028, A, A/V2 7554 with I_h raised to 300, for plate-pulsed use, $F_{\max}$ 4.0, 1 kW typical pulse output {A15205} (1965). Also usable as CW amp. with output of about 6 W, or as a series regulator or hard-tube pulser. "V2" has different grid, for use in 4094 assembly.



H-P 417A VHF Detector, a 10-500 MHz lab receiver using a 5876 as superregenerative detector. Intended for use in taking measurements with an impedance bridge, it also works for international short wave.



T-435/AMT-4B radiosonde transmitter, with Raytheon-made 5794 oscillator at left of conical ground plane.

4038 Ruggedized high-rel. gold-plated type {A15241-V1} (1961), sold only to Bendix Corp. and Sandia Labs.

4055, V1 Power type; I_h 295, μ 70, P_d 10, $F_{\max}$ 4 GHz; giving 1 kW pulse output at 1 GHz {A15499} (1967). Also usable as a series regulator or hard-tube pulser. Constructed differently from 4028 although for similar uses. "V1" has special processing.

4062, A Power type intended as a cathode-pulsed osc. (1967), 4055 with μ raised to 100, P_d 10 W, $F_{\max}$ 4 GHz, 600 W pulse output at 1.09 GHz.

4065 Power type, 4055 with special processing (1967). Delivered 1.3 kW pulse output at 3 GHz.

4075 4055 with special environmental limits.

A15549,V3 Tubes made for use in assemblies.

A15611 Used in assemblies.

A15620 Used in low-power assemblies.

A15621 Used in high-power assemblies.

PACKAGED ASSEMBLIES

A15129 CW osc., 1.66-1.7 GHz.

A15131 CW osc., 1.0-1.2 GHz.

A15132 Plate-pulsed osc., 1.0-1.2 GHz.

4046 Osc. (μ) for CW use near 1 GHz) {A15376}. Dev. for Sylvania in 1961, withdrawn 1965.

4060 Osc., for 1.09 GHz, for airborne IFF (identification-friend-or-foe) transponders, for use with 4061 amp.; I_h 660 mA total, P_d 18 W total, 1.1 kV max voltage {A15487} (1967). For grid pulsing. Package includes tuning screws and coax output fitting.

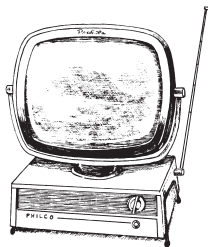
4061 Amplifier for use with 4060, 500 W pulse output {A15488} (1967).

4063-64 Osc. and amp. resp., for 1.09 GHz transponders (1967). Other details lacking.

(continued on page 62)

TELEVISION

EDITED BY **RICHARD BREWSTER**, 145 LITTLE PECONIC BAY ROAD,
CUTCHOGUE, NY 11935 PLEASE INCLUDE SASE FOR REPLY.



Fifty-One Years of Color Television

The RCA CT100 is commonly credited with being the first color television receiver, but according to *Radio-Television News*, it was not the first set available for sale to the general public.

In March of 1954, Westinghouse was marketing a fifteen-inch color receiver, the 840CK15, utilizing the RCA-developed 15GP22 shadow mask tube. Yes, it was my old company, Westinghouse, that offered the set to the public for \$1295. To put that in perspective, consider that one could buy a new 1954 Ford for \$1548! And, in fact the actual picture was only 12½-inch diagonal when many B/W sets at that time were 21-inch!

Sure, RCA was building sets; in fact they first demonstrated a five-inch shadow mask tube in

1949 and went on to market the famous CT100. In fact, RCA had shipped approximately 1000 tricolor kinescope tubes to many potential set manufacturers by the end of October 1953.

Color set manufacturing began at the Westinghouse Metuchen, NJ plant in January, 1954 according to *Westinghouse News*.

The Westinghouse console set weighed 250 pounds and the 44 tubes drew 500 watts.

Radio & Television News explains in "At Home With Color Television," "The only exception [to the unavailability of color sets in March 1954] was the announcement by Westinghouse that color television sets were now available for sale and delivery to the public." The publication's editor requested the loan of one of the first sets and was disappointed to find that, for the first three days of his trial, there were no color programs at all. A CBS program was then received with mixed reviews: "Skin tones were yellowish and lip makeup was excessive." The article went on to explain that there was only about one hour a week of mediocre subjects telecast in color.

Finally, "NBC set up their color cameras at New York's Botanical Gardens. This production was excellent from both color and production standpoints. It is a real thrill to enjoy the sparkle and life produced by various plants and flowers when seen in their true colors... Yes—color TV is here and it's terrific!"

In a sales brochure, Westinghouse explained that their "True Chromatic" Color TV was as easy to operate as a black and white receiver. Not quite. I remember that in the early 1960s, my mother was watching a color program on our 21-inch color set in black and white because she had neglected to set the fine-tuning properly! This adjustment was rather critical in the early sets.

The Westinghouse operating instructions suggested that room lighting should not be too bright and that, "The receiver should be located so that sufficient area directly in front of the receiver is available for convenient guest accommodation." Good advice!

But, according to *Radio & Television News*, only about 100 hours of color broadcasting was available through the year of 1954! Checking TV



Cover of instruction booklet for the Westinghouse Model H-840CK15.



STYLED FOR CONTEMPORARY LIVING

Another distinguished furniture style by Westinghouse. Luxurious imported mahogany veneer set off by satin-finish brass in a clean, uncluttered treatment that will retain its youthful outlook for years. Model 840CK15.

COME IN FOR AN EXCITING DEMONSTRATION

Answering Your Questions About COLOR TV

Is Color TV easy to operate?

Westinghouse-engineered automatic color circuits require only four simple controls in ordinary channel-to-channel tuning, as simple to operate as most black-and-white TV sets.

Can I get black-and-white programs?

Of course . . . automatically, without any complicated switching to black-and-white circuits. When color is not being transmitted, enjoy brilliant, rock-steady monochrome TV.

Are all color receivers alike in picture quality?

Westinghouse Color TV was independently developed in Westinghouse laboratories over many years, incorporates exclusive features no other receiver can offer. See a personal demonstration of TRUE-CHROMATIC Color TV.

YOU CAN BE SURE...IF IT'S

Westinghouse

WESTINGHOUSE ELECTRIC CORPORATION
TV-RADIO DIVISION, METUCHEN, N. J.



Pages from the Westinghouse TV-840CK sales brochure.

Guide for the week of July 9-16, color programming consisted only of several half hour programs of beauty advice, a one-hour kids program, and an evening drama. Oh yes, NBC (RCA) also did remote telecasts from Mt. Vernon and Robert E. Lee's home in Virginia! All except the drama were daytime shows. CBS did the kid's program.

By the time our family got a color set in 1960, there was usually at least one color show each evening. I'll never forget the time there were two color shows on different channels at the same time! And there were no VCRs!

PS: I did once own a 15-inch Westinghouse color set but donated it to the George Westinghouse Museum in Pittsburgh, PA, where it is

now on display!



REFERENCES

- Radio & Television News*, June 1954
- Proceedings of the IEEE*, September 1976
- Westinghouse Sales Bulletin* #5, February 29, 1956
- Westinghouse News*, January 12, 1954
- Westinghouse TV-840CK sales brochure
- Operating instructions for the Westinghouse Model H-840CK15 Color Television Receiver
- Consumer Guide* "Cars of the 50s," Fall 1978
- RCA Service News*, Mar-Apr 1954
- TV Guide* Vol.2, No. 28, July 9, 1954

THE VACUUM TUBE, continued from page 60

4068 Osc., for 1.09 GHz, I_h 330A, P_d 15 W, 500 W pulse output 1970). Package includes tuning screws and coax output fitting.

4070-71 Osc. and amp., for 1.09 GHz, revised 4060-61 (1970).

4072 Osc, for 1.09 GHz, 4070 in different case, 1970.

4080-81 Osc. and amp., appear to be uprated versions of 4060-61, I_h 1.1 A total, P_d 18 W, 600 W pulse output.

4085 Cathode-pulsed four-tube amplifier for IFF transponders, I_h 1.3 A total, P_d 20 total.

RADIOSONDE OSCILLATORS

Each has cylindrical body with 0.151" 50-ohm

coax line out top, B+ terminal out top, tuning screw(s) out side, and heater connections out bottom.

5794 Final registration actually released earlier than 5675 {A2354} (3-4-49); I_h 160 at 5.2-6.6 V, P_d 3.6, 300 mW out at I_h of 135. Max B+ is 130 V.

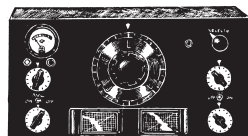
6562/5794A Cost-reduced 5794 with 1.5" leads for heater in place of pins {A2354E} (9-12-55).

7533 6562/5794A with both resonators tunable (12-28-59). Tested lifetime is 5 hr.

4048V3 Silver-plated 6562/5794A.



THE COMMUNICATIONS RECEIVER



EDITED BY **WILLIAM FIZETTE, W2DGB**, RR 1, BOX 1634, HENRYVILLE, PA 18332
E-MAIL: w2dgb@arrl.net. PLEASE INCLUDE SASE FOR REPLY.

A Mystery Airport Receiver

A recent ice storm in northeastern Pennsylvania left us without power for two days. Not being able to use the shop I cast about for something to do besides reading. I chanced upon a rack-mount communications receiver that I had purchased at the AWA annual meet some five years ago, and became curious about exactly what it was. Placing it upon a small table in front of a window for light, I started making notes.

It was obvious that this was indeed a mystery receiver, at least to the writer. The provenance is missing. The name plate and the frequency chart are gone, and with them most hope of positively identifying the set. While it was a commercially manufactured receiver, there are no markings anywhere. So I still don't know who made it, for what service it was intended, and when and where it was manufactured.

However, a considerable amount of information could be acquired from a careful inspection of such a radio. As noted, it was definitely of commercial manufacture and was obviously made to exacting specifications. The metal work is too perfect and too complex to be either a home-brew or a shop model; the wiring has a commercial look; and numerous components have printed ID numbers.

The heavy aluminum chassis is welded at the corners and rounded off, and the 1/4" aluminum front panel was commercially painted with an alligator finish, similar to many General Radio, and some National, products of the period. Underneath, there are six tapped mounting blocks, riveted to the chassis, to hold an inserted bottom plate. There were also provisions for a dust cover, but it along with the bottom plate, was missing.

The tube complement consists of seven 39/44 pentodes, a 37 triode, and an unidentified six-prong, single-ended amplifier tube which is

probably a type 42. There is a single three-section coil set, which is plugged in from the front panel, covering the range of 3.95 to 4.5 mHz. The power is fed in through a six-foot, four-wire, cloth-covered cable, and antenna connections consisted of three one-foot long wires.

The front panel controls are labeled SELECTOR, TEL SPKR, CW VOICE, MVC AVC, and VOLUME. There is also one unlabeled control which had to have been added later; it appears to



Front view of the mystery set. Note the large handle on the coil set and the very simple control arrangement.

be a second gain control. The three-section tuning capacitor is tuned with a heavy-duty rack and pinion gear arrangement, similar to that used on the National AGS receiver. The audio section uses two transformers, one more indication that this receiver was designed and manufactured as a quality product.

Even though most of its components are of different manufacture, this radio appears to be a functional copy of the early 1930s National Company RHP airport receiver discussed in the *OTB* for February 1996. Both are nine-tube sets, both use remote power packs, and both employ panel-access plug-in coil sets. The frequency coverage is in the same range, and both sets even use the same types of Yaxley rotary switches in the same locations. The panel layout and the out-put connections at the rear are also similar.



Top and bottom views of the receiver. Note the large voltage-divider resistor near lower center of bottom.

All of this suggests that this set is a commercially-made airport model of early 1930s vintage.

There are some interesting components in this set. For example, there are vibration-resisting lock nuts (the ones with red-plastic inserts) similar to those used in World War II gear. This didn't make sense, considering the apparent age of the receiver, until a very close inspection showed that they had probably been added later. However, they surely weren't needed!

The single large multi-section glazed-ceramic power resistor used as a bleeder and voltage divider is a departure from the National design. The National receivers had individual resistors mounted on a terminal board.

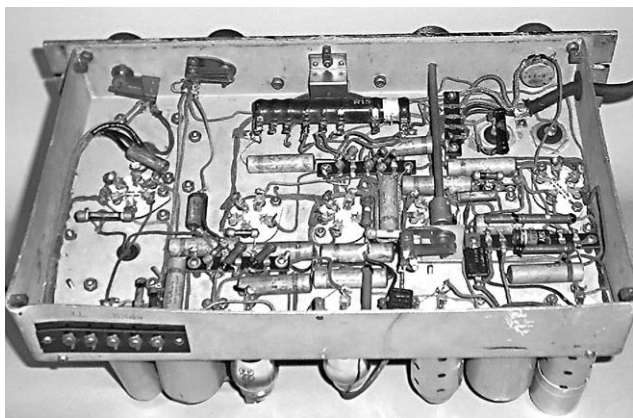
This radio would have been simple to install and operate. Once the set was mounted in the rack, the only connections would have been an antenna and ground, the power pack, and the output. The "selector" or main tuning control is graduated in 150 divisions, and the tuning should have been relatively easy. Once the switches were set, the two gain controls would have been all that had to be adjusted. There was no squelch.

As purchased, this radio looked just fine from the front. However, it had suffered abuse. The chassis rear was badly bent and one knob, a tube,

and five tube shields were missing along with the bottom plate and dust cover. There had been some servicing, but most of the parts were original, including the by-passes and resistors.

There will be some unique challenges in restoring this set to working condition, including tracing of the circuit. The details will be reported in my "fixing-up" column in a future *AWA Journal*.

One can at least speculate about the origin of this receiver. One scenario might be that a government service connected with the growing aviation field required a number of airport ground receivers. But



for some reason (availability, price, lead time, etc.) it was unwilling or unable to purchase the well-known National Company products. Instead, an order may have been placed with a company, such as RCA, which did contract work.

The circuit does not appear to be in the Rider's Manuals of the period, and it is not pictured in either of my two Moore books on communications receivers. The government tie-in assumption is based on two points. First, is the removal of the charts and identification label; second is the fact that the aeronautic radio service, including airport ground stations, was government operated.

All that aside, there must have been a production run of these radios, and it is possible that one of our readers will recognize it from the photographs. The writer would dearly love to be able to report that the "mystery" radio has been identified. How about it, readers? Any comments? ☐



CLASSIFIED ADS

Old-time ads are free to members collecting and restoring equipment for personal use. *The AWA Journal* classified ads are also available for browsing in the "AWA Journal On Line Edition" on our Internet Web site (www.antiquewireless.org).

Please observe the following: (1) include as SASE if acknowledgement is desired; (2) material must be more than 25 years old and related to electronic communications; (3) give your full name, address and zip code; (4) repeats

require another notice (we are not organized to repeat automatically); (5) the AWA is not responsible for any transaction; (6) we retain the right to reduce an ad's size if over seven lines; (7) AWA does not accept commercial advertising in this column; and (8) closing date is six weeks prior to first day of month of issue. Ads received after that time will be held for the following issue. Mail all ads to: RICHARD RANSLEY, P.O. BOX 41, SODUS, NY 14551. **NOTE: YOU MAY NOW E-MAIL YOUR ADS TO: richardransley@mac.com.**

SELL/TRADE—BC/SW TUBE RADIOS

1950s tube radios: Telefunken Atlanda, plastic (beige/magenta) cabinet, \$90.; Telefunken Jubelate, wooden cabinet, one knob not original, \$60.; Murphy model 152, bakelite (white/brown), \$80.; 1940s radios: Tesla 505U, bakelite, \$80.; Tesla 402U, bakelite, \$90. Argyrios Adamitis, Panoramatos 38, Panorama, Thessaloniki, Greece 552 36 E-mail: aadam@acc.teithe.gr

Zenith Model 10S669, Philco 42-355. John Zima, 1360 Reed Road, Churchville, NY 14428 (585) 293-3023 jfz_rhy@yahoo.com

SELL/TRADE—COMMUNICATIONS GEAR

Transceivers and transmitters, some need repair, Johnson Ranger and Valiant, Kenwood TS-830S, Heathkit HW-22, AMICO TX-62, Heath SB-200, Ten-Tec Pagagon & matching power supply, also some home brew AM transmitters. Make an offer, some or all, you must pickup. Robert Dryburgh, W3RLX, Turtle Creek, PA 15145 (east of Pittsburgh) Phone calls between 9 a.m. and 9 p.m. EST only, please

SELL/TRADE—GENERAL

"Mandelo" reproducer arm \$20. Shipping extra. Robert Rossi, 10936 Melbourne, Allen Park, MI 48101

Amperex three-ring dealer catalog of solid state diodes/transistors, etc., \$25 (includes shipping); NOS Cycle Dyne transmitting tubes (3) (made by Amperex, equivalent to their 8179), \$50 each plus shipping. Harry Goldman, 3 Amy Ln., Queensbury, NY 12804

A repair shop/business, mainly electric/electronic that must be sold to one person having a big truck. Radios, TVs, amplifiers, mics, horns, phonos, clocks, watches, CBs, weather, aviation, speakers, cabinets, chassis, panels, meters, transformers, coils, 60 years of ham radio parts, telephones, Hi-Fi stuff, testing in-

struments for AM/FM, TV, heating air conditioning for automotive and home using temperature-pressure, humidity apparatus. A special price to take all. Francis H. Yonker, W2IBH, 1229 N. Inverary Place, State College, PA 16801 (814) 867-1400 E-mail: yonker1229@adelphia.net

Mallory VP555 Vibrapack 6.3 volt DC input 300 volts at 200 mA output, \$30; four-section shielded variable capacitor, 250 pF per section, 11 1/8" L x 5 1/2" W x 4" D, 1/32" shaft on ball bearings front only, weighs 12 1/2 lbs., \$30. Bill Beckett, 6 Wax Myrtle Lane, Hilton Head, SC 29926 (843) 837-2435 E-mail: wbeccath@hargray.com

I have been an AWA member since 1987 and am offering the contents of a TV repair shop run by Ralph Trenka of Bellrose, NY which I purchased in the 1970s. I want to sell/give it to someone who will appreciate it. There's a wide variety of components, test equipment and manuals. Mark Nickson, E-mail: mnickson@sbcglobal.net (203) 459-4757

Receiver with 3 repro audions that appeared in one of my previous "Breadboarding" *Journal* columns. Am running out of room, so will let this set go to any AWA member for parts cost: basically \$300 for the repro triodes and another \$100. for the rest of the parts. Works fine per the articles, and looks great. The single-tube set has been sold. Here is your chance to acquire a great looking repro. Dick Parks, 2620 Lake Ridge Ct., Oakton, VA 22124 (703) 242-8268 E-mail: rparks9@cox.net

Old radios and unusual items, manuals, magazines, books, service sheets, HRO coils and 2500 unlisted valves - pictures & lists available. Lifetime collection of silent key. Richard Birkett, 42, Halvarras Rd., Playing Place, Truro, TR3 6HD Cornwall, United Kingdom. E-mail: Richard@rab-eng.wanadoo.co.uk

Crystal and magnetic cartridges rebuilt. Also the cutter heads for the Home Recorders. Other services on phonograph parts. Gib Epling, West-Tech., 570

SELL/TRADE LITERATURE

Have copies of manuals for the Kennedy 110 and 220 as well as original AK1928 service manual for trade. Want original or copy of a manual for the Kennedy 281. Charles Solie, 1409 Jeanie Court, Las Cruces, NM 88007

1928-1943 European radio schematics, more than 1300 pages, \$90.; Old Austrian manufacturer's industrial catalog with lithographs, dated 1906 with 2200 pages, \$60.; a similar catalog dated 1908, with 1600 pages, \$50. Argyrios Adamidis, Panoramatos 38, Panorama, Thessaloniki, Greece 552 36 E-mail: aadam@acc.teithe.gr

Original Manuals, large selection, for EICO, B&K, Superior, Hickok, RCA, HP, Accurate, Collins, Conar, Heathkit, Hallicrafters, Hammarlund, National, Globe/WRL, Zenith, Allied, Multi-Elmac, Knight-Kit, Johnson, Gonset, B&W, RME, Harvey-Wells, Morrow, Lafayette, Mosley, Drake, Regency, Ameco, Clegg, Pierson, Davco, Realistic/Archer, Subraco, Simpson, Triplett, Howard, Millen, Echophone, McMurdo Silver, Paco, Central Electronics, Eldico, Boonton, Dynascan. A. J. Bernard, P.O. Box 690098, Orlando, FL 32869-0098 (407) 351-5536 E-mail: ni4Q@juno.com

SELL/TRADE—PARTS

RCA Radiola 60 cabinet, Westinghouse WR-6 console, Philco 46-1209 console, early Crosley console, 1920s highboy cabinet for 3 dialer receiver, has built-in horn speaker. Chassis: Stromberg Carlson Model 225 chassis and speaker, Stromberg Carlson Model 228 chassis and speaker, Admiral Model 7C64 chassis and speaker. John Zima, 1360 Reed Road, Churchville, NY 14428 E-mail: jfz_rhy@yahoo.com (585) 293-3023

Pre-WWII through 1970s parts, receiving and transmitting tubes, power and filament transformers, filter chokes, oil filled filter caps, Sola regulator transformers. Make an offer, some or all, you must pick up. Robert Dryburgh, W3RLX, Turtle Creek, PA 15145 (east of Pittsburgh) (412) 823-2944 Phone calls between 9 a.m. and 9 p.m. EST only, please justradios@yahoo.com

Interference Suppression/Safety Capacitors for across-the-line and line-to-line ground circuits in tube radios. Types X2, Y2 and X1Y2 available. For price list and product info., please contact Dave Cantelon, 42 Clematis Rd., North York, Ontario, Canada M2J 4X2

SELL/TRADE—TEST GEAR

Simpson 260 VTVM (2), one in travel case, checked, new batteries, \$35. Other one needs new meter, \$15. Copy of manual with each. Robert Martin, 111 Ban-

croft Dr., Rochester, NY 14616 (585) 663-4482

Simpson 260, not working, \$10.; SECO HC8 in-circuit current tester for output tubes, \$15.; Sencore LC3 tube leakage tester, \$15.; Heathkit TC-2 tube checker, \$45.; Triplett 3434 Sweep Marker Generator, \$25.; CRT JAN5FP7A, \$10. Shipping extra. Robert Rossi, 10936 Melbourne, Allen Park, MI 48101

SELL/TRADE—TRANSISTOR/CRYSTAL SETS

1970s large portable transistor receivers: Telefunken multiband, \$50.; Soviet multiband transistor receivers, \$50. to \$90. Argyrios Adamidis, Panoramatos 38, Panorama, Thessaloniki, Greece 552 36 E-mail: aadam@acc.teithe.gr

WANTED—COMMUNICATIONS GEAR

National NTX or NTE transmitter, any condition. I love all kinds of National gear, from HROs to 1-10s. Also interested in old National parts and HRO series (black crackle paint only please) receivers. Bruce Howes, 213 Murphy's Corner Road, Woolwich, ME 04578

Collins 312-A speaker (this speaker has a lamp and chrome lamp cover across front top); National SW-5; Eldico S-119; type 46 and 10 tube; QSL cards from 1920s; QSL card for 9CXX or W0CXX Scott Freeberg, WA9WFA, 327 Wildwood Avenue, Saint Paul, MN 55110 (651) 653-2054 E-mail: wa9wfa@qsl.net

VFO suitable for the Globe Scout transmitter. Must be in good condition. Thanks: Bill Gibson, GM0KMG, 180 Castlemilk Road, Glasgow G44 4NS, Scotland

National Dog House 5897 P.S. and National NTE transmitter for restoration and use. Sylvia Thompson, N1VJ, 33 Lawton Foster Rd. S., Hopkington, RI 02833 Tel. (401) 377-4912 E-mail: N1VJ@ARRL.net. To view my National collection: QRZ.com via my callsign, N1VJ

WANTED—GENERAL

67 1/2 VDC battery eliminator to replace a 467 battery. Also want Regency 6 transistor and Zenith Royal transistor radios in working condition. Thanks. Allan Sherry, F54 5445 Netherland Avenue, Bronx, NY 10471

Morris coil winding machine; Mohawk Model S-6 radio chassis, non-working OK; operating instruction card for Grebe Synchrophase MU-1. Fits in the inside back of cabinet. Reproduction OK. James Fisher, RR1 Box 861, Port Royal, PA 17082 Tel. (717) 527-2224 E-mail: yrless@tricountyi.net

Garrard Model 80 or similar or Garrard single play turntable. Cartridge and spindle not required, but must

have pickup shell. Charles Graham, 4 Fieldwood Drive, Bedford Hills, NY 10507

750K balance control (177254) for Dynaco PAS-3X, overhang gauge PEC-012 for Pioneer PL-90 turntable, Service Manual for Marantz 8. Phillip Drexler, P.O. Box 16445, St., Paul, MN 55116 (651) 236-5330

Buying 1940s 7 inch TV sets, also want a Zenith R520/URR military Transoceanic and any brown leather Zenith Transoceanic. Thanks! Charles Harper, 2000 Jackstown Road, Paris, KY 40361 (859) 484-9393

WANTED—INFORMATION

Seeking info on a Radio Shop Echophone Model A regenerative receiver manufactured in 1923 in Sunnysvale, CA. Especially looking for circuit and tuning information. Contains two 201A and one Excello-tron tubes. Thanks! Steven Jones, 423 South Upper Street, Lexington, KY 40508-2917 E-mail: zsw@insightbb.com

Still looking for Wilcox Gay A-17 radio. Also Beetle plastic radios, especially the Sonora model TW-49. Also information brochure or advertisement for the Silvertone 4760 Coronet radio. Especially need a black pointer and three knobs for the Silvertone 4760. Would like to communicate with anyone owning a Coronet radio regarding the correct pointer and knobs. Thanks in advance. Joseph DiCaro, 4155 Lastrada Heights Mississauga, Ontario, Canada L5C 3V1 E-mail: deco-radio@primus.ca Tel: (905) 848-7759

Anything by David Grimes: radios, especially Model 3XP, and advertising, ephemera, literature, references, parts. Mike Grimes, K5MLG, 5306 Creekside Ct., Plano, TX 75094 (972)384-1133 E-mail: grimesm@flash.net

Information on Gross Radio Corporation and Jerry Gross, and information on Eldico Radio and Don Merten, K2AAA. Scott Freeberg, WA9WFA, 327 Wildwood Avenue, Saint Paul, MN 55110 (651) 653-2054 E-mail: wa9fwa@qsl.net

WANTED—LITERATURE

Schematic diagram for Marconi Model 37 radio receiver. Louis Pedneau, 702 E. Jacques Cartier, Chicoutimi Qc, Canada G7H 2A5 (418) 549-8647

Manual for my Precision 612 tube tester. John Smith, 1924 Dolphin Blvd., St. Petersburg, FL 33707

Schematic for a B&K TV Analyst, Model 1076 and a Rider Volume Zero (1929). Donald Swope, Box 41, Tremont, PA 17981

WANTED—PARTS

“Kino Lamp,” Raytheon or similar. Jerry Talbott, 4403 NE Birdhaven Loop, Newberg, OR 97132-6994 E-mail: Vinradio@easystreet.com Tel. (503) 538-4041

Band selector knob for Zenith T.O. 7000. Robert Rossi, 10936 Melbourne, Allen Park, MI 48101

Air-Way Model F parts set. All under chassis components and main tuning knobs needed. Bob Slagle, P.O. Box 3455, Pueblo, CO 81005 (719) 564-7894 E-mail: peakradio@comcast.net

Complete motor for a 20¾ inch Regina disc player. Will pay cash or trade antique radios or phonographs. John O'Briant, 3120 Hartford Dr., Bettendorf, IA 52722 (563) 332-7749 E-mail: jloradio@mchsi.com

Meters for the following tube testers: Western Electric KS-15750; Weston 774-5 Analyzer. Will take junker if meters are good. Walter Hughes, WB4FPD, 6 Academy Ct., Berryville, VA 22611

AK 66 chassis. Please call evenings only. Bob Lane, 10332 Mohawk Lane, Leawood, KS 66206, (913) 648-5296

Looking for the dial escutcheon and three knobs for my Westinghouse WR12 Columnaire Junior; need a good working chassis and control knobs for my Buddy Boy pressed wood radio; looking for a working chassis for a Westinghouse table model N202, or junker set with good chassis. Also need 12 inch electromagnetic speaker for my RCA Model 9K3. Any 9K model speaker will work. Terry Kelly, 554 Millbrae Ave., Santa Rosa, CA 95407 E-mail: WDX6TJK@aol.com

Cabinet for a Cleartone made in Cincinnati. Brass panel drops down into slots in side posts. Can supply photo. Merrill Bancroft, 169 South Row Road, Townsend, MA 01469 E-mail: ritareo@juno.com E-mail: charper@kyk.net

WANTED—TEST GEAR

Micronta Voice Meter-Multitester Model 22-164. These were sold in the 80s and part of the 90s by Radio Shack. I especially want this for a blind friend/radio amateur, but also want one for myself. Ellsworth Johnson, formerly W7QGX, 364 S. Coeur Dalene St., Spokane, WA 99204-1063 (509) 838-2161 E-mail: eojohnsonww2@concast.net

WANTED—TUBES/TRANSISTORS

DeForest 420-A receiving tube. Dud filament acceptable. John H. Walker, Jr., 13406 W. 128th Terrace, Overland Park, KS 66213 (913) 782-6455 E-mail: jwalker83@kc.rr.com

BUSINESS CARD ADS

Are you offering a product or service of interest to antique radio enthusiasts? Would you like to let the world know about the tubes, sets or paper you'd like to acquire? Place a business card in this space for the low price of \$15.00 and it will be seen by over 4,000 hard core devotees of our hobby. Purchase a year's worth of insertions (four issues) for \$50.00 and save \$10.00 over the individual ad pricing.

Send us a copy of your business card, or a special typeset ad designed to fit our standard space. We can, alternatively, typeset a short message for you (no more than eight lines, 50 characters max per line, please). For the time being, there will be no charge for typesetting. All ads must be for radio-related items or services and must be paid in advance. Send your ads and checks (payable to AWA Museum) to Edward M. Gable, 187 Lighthouse Rd., Hilton, NY 14468. Closing date is six weeks prior to first day of month of issue. **All advertising income is used to further the conservation work of the A.W.A. Electronic Communication Museum.**

ANTIQUE TUBES WANTED

We buy and sell Collector and Pre-Octal Tubes
See www.fathauer.com for listing or for catalog e-mail tubes@qwest.net or call
George H. Fathauer & Assoc., LLC
688 W. First St., Ste. 4, Tempe, AZ 85281
Phone: 480.968.7686 Fax: 480.921.9957
Call Toll Free: 877-307-1414

Wanted Grebe

Hard to Find CR Series Radios and R Series Amplifiers.

Original Instruction Manuals and Other Literature

Steve Wallace (610) 944-7230
3707 Pricetown Rd. kkks@epix.net
Fleetwood, PA 19522

Bob's Antique Radios

Buy-Sell Trade

Quality Capacitors and Electrolytics at fair prices

For more Information visit
radioantiques.com or Email
radiobob1@aol.com

RADIO BOOKS WANTED

Always buying: Books, Magazines and Manuals.
Single items or collections. A huge selection of books on radio and related technology in our shop and catalogs. Call or visit our web site: www.beqbooks.com

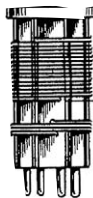
BEQUAERT OLD BOOKS
P.O. BOX 775, FITZWILLIAM NH 03447

Toll Free (888)-447-5037 info@beqbooks.com



6221 S. Maple Avenue Tempe, Arizona 85283 USA

Phone 480.820.5411
Fax 480.820.4643 or 800.706.6789
www.tubesandmore.com
info@tubesandmore.com



Highest quality how-to books!

Brand new & reprints of classics.
Early radio, electronics, electricity, machines, science & tech! Projects, plans, nuts & bolts. **Big catalog!**
<http://www.lindsaybooks.com>

Lindsay Publications

PO Box 538 Bradley IL 60915



ESTES AUCTIONS

Specializing in Vintage Radios & Radio Appraisal Service
www.estesauctions.com

7404 Ryan Road
Medina, Ohio 44256

Phone: (330) 769-4992
Fax: (330) 769-4116

E-mail: estes.auctions@aol.com

Hard-to-find and special quality VINTAGE TUBES !

Antique • Collectable • Transmitting Audio • Special Purpose

www.WEBTUBES.COM

203-226-0700

PO Box 1223 Weston, CT 06883



Capacitors & Schematics for Tube Radios

David and Babylyn Canteen
42 Clements Rd., North York
Ontario, Canada M2J 4X2

www.justradios.com
justradios@yahoo.com
(416) 502-6128

400 Vol Film Capacitor Part #s

Part #	Value	Part #	Value
00001	500K	00025	250K
00002	100K	00026	100K
00003	50K	00027	50K
00004	25K	00028	25K
00005	10K	00029	10K
00006	5K	00030	5K
00007	2.5K	00031	2.5K
00008	1K	00032	1K
00009	500K	00033	500K
00010	100K	00034	100K
00011	50K	00035	50K
00012	25K	00036	25K
00013	10K	00037	10K
00014	5K	00038	5K
00015	2.5K	00039	2.5K
00016	1K	00040	1K
00017	500K	00041	500K
00018	100K	00042	100K
00019	50K	00043	50K
00020	25K	00044	25K
00021	10K	00045	10K
00022	5K	00046	5K
00023	2.5K	00047	2.5K
00024	1K	00048	1K
00025	500K	00049	500K
00026	100K	00050	100K
00027	50K	00051	50K
00028	25K	00052	25K
00029	10K	00053	10K
00030	5K	00054	5K
00031	2.5K	00055	2.5K
00032	1K	00056	1K
00033	500K	00057	500K
00034	100K	00058	100K
00035	50K	00059	50K
00036	25K	00060	25K
00037	10K	00061	10K
00038	5K	00062	5K
00039	2.5K	00063	2.5K
00040	1K	00064	1K
00041	500K	00065	500K
00042	100K	00066	100K
00043	50K	00067	50K
00044	25K	00068	25K
00045	10K	00069	10K
00046	5K	00070	5K
00047	2.5K	00071	2.5K
00048	1K	00072	1K
00049	500K	00073	500K
00050	100K	00074	100K
00051	50K	00075	50K
00052	25K	00076	25K
00053	10K	00077	10K
00054	5K	00078	5K
00055	2.5K	00079	2.5K
00056	1K	00080	1K
00057	500K	00081	500K
00058	100K	00082	100K
00059	50K	00083	50K
00060	25K	00084	25K
00061	10K	00085	10K
00062	5K	00086	5K
00063	2.5K	00087	2.5K
00064	1K	00088	1K
00065	500K	00089	500K
00066	100K	00090	100K
00067	50K	00091	50K
00068	25K	00092	25K
00069	10K	00093	10K
00070	5K	00094	5K
00071	2.5K	00095	2.5K
00072	1K	00096	1K
00073	500K	00097	500K
00074	100K	00098	100K
00075	50K	00099	50K
00076	25K	00100	25K
00077	10K		
00078	5K		
00079	2.5K		
00080	1K		
00081	500K		
00082	100K		
00083	50K		
00084	25K		
00085	10K		
00086	5K		
00087	2.5K		
00088	1K		
00089	500K		
00090	100K		
00091	50K		
00092	25K		
00093	10K		
00094	5K		
00095	2.5K		
00096	1K		
00097	500K		
00098	100K		
00099	50K		
00100	25K		

www.ChildhoodRadios.com
The Resource for 50s & 60s Electronics Collectors

Free shipping for AWA Members. Mention this ad!



Parts, Supplies, How to Videos,
Message Board, Links to Collectors
and their Collections, Restoration and
Service Documents, Specialize Tools,
Hard-to-find Batteries and Adapters.

LETTERPRESS PRINTED QSLs LIKE WE LOVED IN THE OLD DAYS QSLs BY SMOKEY W9STB

8679 PINKHURST DRIVE
MINOCQUA, WI 54548

telegrapher@hotmail.com

\$ 1 for samples

Radio Recycler

Antique Radio Repair and Restoration

www.radiorecycler.com

Dean Jones
13643 Palm Street
Hesperia, CA. 92345

(760)221-4098



<http://www.radioswapmeet.com>

Antique and Vintage Electronics Exchange

Your #1 Radio Resource
Everything in one place
Free Membership!!

Come Join the Fun!



MAIN OFFICES & RETAIL STORE
7620 Omnitech Place, Victor, NY 14564
Tel: 585-742-2020 Fax: 585-742-2099
Our Website: www.radiodaze.com

VINTAGE RADIO & ELECTRONICS



Your Source For:
Vacuum Tubes - Components - Books
Transformers - Glass Dials - Tools
Workbench & Refinishing Supplies
ASK FOR OUR FREE CATALOG!
email: info@radiodaze.com



TUBE COLLECTORS ASSOCIATION



Tube Collector magazine, meet-
ings, tube-related Special Publications. For
details, call Ludwell Sibley on (541) 855-5207
or contact tubelore@internetcds.com.

SUPER HET SCHEMATICS

1918 to 1930

Schematics • Layouts • Construction Info • Ads

Over 600 Brands, Models, and their Variations Documented.

www.superhets.info

Toll Free: 888/ 473-2387

Watch for "The Rolls Royce of Reception,
An Encyclopedia for 1920s Super Heterodyne Collectors"



Modern Radio Laboratories
Since 1932

Crystal Set and One Tube Instructions. Exclusive source,
printing and publishing of all MRL Handbooks & literature
by Elmer G. Osterhoudt. Tested instructions and plans.

Catalog \$2.00 ppd.

MODERN RADIO LABS
P.O. Box 14902-A
Minneapolis, MN 55414-0902

BUYING

- Old Radios
- Ham Gear
- Speakers
- Theater Equipment
- TUBES
- Microphones.
- Amplifiers
- Repair Shop Items

Recording Studio / Broadcast Station
Outdated Parts / Supplies
One Item or Entire Collections

Call Me

Johnny "Electron John" Carson, Jr.
(724) 858-1608 or (724) 730-5093
email: jpcarson2@aol.com

ARBE-III

Universal Battery Eliminator

\$149.95 + S/H

Antique Radios Inc, PO Box 6352

Jackson, Michigan 49204

Web: www.arbelij.com

Email: arbelij@yahoo.com

Phone (517) 787-2985 Evenings

NOW AVAILABLE FROM THE AWA MUSEUM STORE

AWA REVIEW VOLUME 17

This 214-page volume contains five fascinating articles:

(1) "The Regency TR-1: 50 Years Later," by Paul Farmer
2004 is the 50th anniversary of the introduction of the first consumer transistor radio, the Regency TR-1, in 1954. Hence this comprehensive article about the TR-1 is extremely timely.

(2) "A History of the Kodak Radio Corporation" by John Leming, Jr.
Kodak is an important 1920s radio company, yet very little of its history has been documented. This engrossing article about Kodak and its founder, Clarence Ogden, addresses that need. Author John Leming has interviewed members of the Ogden family to uncover new information.

(3) "Broadcast Receiver Manufacture by General Electric and Westinghouse in the First Decade of RCA" by Robert Murray

Robert Murray has done extensive research on what occurred behind the scenes when GE and Westinghouse were producing RCA radios during the 1920s. RCA collectors and those interested in radio developments at GE and Westinghouse will find this article especially helpful.

(4) "Evolution of the Submarine Telegraph With an Extensive Bibliography" by Bill Holly

Bill Holly provides a detailed chronology documenting key developments in submarine cable technology, and has prepared what is probably the most extensive listing of books and articles about submarine cables ever published.

(5) "The Evolution of the National HRO and its Contribution to Winning World War II" by Barry Williams

HRO receivers have a well-deserved reputation for their innovative designs, and are particularly popular with collectors of communications receivers. Williams has researched and documented thoroughly the subtle differences among the many HRO models. If you collect HROs, this article is a "must have!"

This volume also includes a cumulative table of contents of all the *AWA Reviews* produced since publication began in 1986. Price, \$19.95 postpaid in U.S. and Canada; elsewhere, add \$5.00. See order form on back page for availability and prices of previous volumes.



THE OTB ON CD ROM

These discs run on any PC or Mac system capable of running Acrobat 4.0 (free copy included). PCs should have 486 or better processor, 10 Mb of free hard disc space, MS Windows 95 or 98 or NT 4.0 with service pack 3 or later.

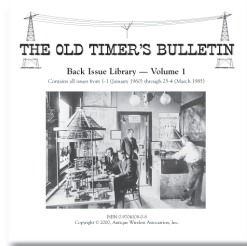
Volume 1 (Contains all issues from January, 1960 - March, 1985)

Price: \$35.95 U.S., postpaid in U.S. and Canada; elsewhere, add \$5.00

Volume 2 (Contains all issues from June, 1985 - November, 1996)

Price: \$35.95 U.S., postpaid in U.S. and Canada; elsewhere, add \$5.00

Volumes 1 and 2 ordered together Price: \$59.95 U.S., postpaid in U.S. and Canada; elsewhere, add \$5.00



AWA REVIEWS ON CD ROM

Now you can acquire these scarce out-of-print volumes for your library. Operating requirements same as for *OTB* CDs above. Volumes 1-5 and Volumes 6-10 available on two separate CDs. Price for either CD, \$19.95 US; both, \$35.00, postpaid in US and Canada. Elsewhere, add \$3.00 per CD.



NEW RELEASES ON CD

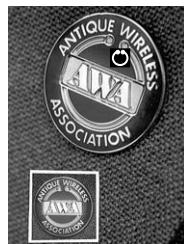
Back by popular demand is the most popular *AWA Review* ever produced, *The Atwater Kent Story*. Written by Ralph Williams, and issued as *AWA Review* #12, it has been long out of print. We now offer it to you in compact disc format for convenient display on any PC with Acrobat Reader Version 4.0 or higher.* As a bonus, you'll receive a printed full-size wall chart showing the progression of A-K radio products. Price is \$14.95, postage paid in U.S. and Canada; elsewhere, add \$5.00.

Another out-of-print classic, *The Hallicrafters Story* by Max DeHenseler, HB9RS, is also back as a CD. Max DeHenseler was a personal friend of Hallicrafters founder Bill Halligan, and his book provides unusual insights into Halligan's life and early struggles. This well-illustrated book has 245 pages, a nice index and several handy lists of models and features. The CD can be displayed on any PC with Acrobat Reader version 6.0 or higher.* Thanks so much to Max DeHenseler for his thoughtful gift of publishing rights to the AWA Museum. Price is \$14.95, postage paid in U.S. and Canada; elsewhere, add \$5.00.

*Acrobat Reader is a free program that can be had via the world-wide-web.

HANDSOME AWA PIN

Replaces the far-too-expensive hand-made gold pins of yesteryear. The new pin maintains the stylized AWA logo surrounded by a Hertz loop, but adds the words "Antique Wireless Association" wrapped around the loop in bright gold. Background is dark blue cloisonné and the pin is clutch mounted. 1" in diameter. Price: \$6.00 US and Canada, elsewhere, add \$1.00.



AWA COFFEE MUG

Heavy porcelain mug in cobalt blue with yellow-gold AWA lettering and logo. good for daily use and dishwasher safe. \$9.75 postpaid in US and Canada.

Make checks out to "AWA Museum" and send to Ed Gable, Curator, AWA Museum, 187 Lighthouse Rd., Hilton, NY 14468.

MUSEUM STORE ORDER FORM All items postpaid to U.S. and Canada

OTB BACK ISSUES Priced at \$3.00 each. 20% discount for orders of 6 or more issues; 30% discount for orders of 12 or more. AWA Review issues do not count towards the discount.

QTY	ISSUE	QTY	ISSUE	QTY	ISSUE	QTY	ISSUE	QTY	ISSUE
_____	25-4	_____	28-4	_____	31-2	_____	34-4	_____	37-1
_____	26-1	_____	29-1	_____	31-3	_____	35-1	_____	37-2
_____	26-2	_____	29-2	_____	31-4	_____	35-2	_____	37-3
_____	26-3	_____	29-3	_____	32-2	_____	35-3	_____	37-4
_____	26-4	_____	29-4	_____	32-4	_____	35-4	_____	38-1
_____	27-1	_____	30-1	_____	33-2	_____	36-1	_____	38-2
_____	28-1	_____	30-4	_____	33-4	_____	36-2	_____	38-3
_____	28-2	_____	31-1	_____	34-1	_____	36-3	_____	38-4
_____	28-3			_____		_____	36-4		

Volumes 39-Current — All Issues Available

AWA REVIEW Priced as indicated. No quantity discount.

QTY	ISSUE	QTY	ISSUE	QTY	ISSUE
_____	Volume 6 \$6.00	_____	Volume 10 \$12.00	_____	Volume 15 \$14.95
_____	Volume 7 \$6.00	_____	Volume 13 \$12.00	_____	Volume 16 \$14.95
_____	Volume 8 \$6.00	_____	Volume 14 \$14.95	_____	Volume 17 \$19.95

CD ROM DISKS Priced as Indicated.

OTB BACK ISSUE CDS

QTY	DISC	QTY	DISC	QTY	DISCS
_____	Vol. 1 (issues	_____	Vol. 2 (issues	_____	Set: Vol. 1
_____	1-1 thru 25-4) @ \$35.95	_____	26-1 thru 37-4) @ \$35.95	_____	and Vol. 2 @ \$59.95

AWA REVIEW BACK ISSUE CD

QTY	DISC	QTY	DISC
_____	AWA Review Vols. 1 thru 5 @ \$19.95	_____	AWA Review Vols. 6 thru 10 @ \$19.95
_____	Set of both CDs @ \$35.00		

OTHER CDS

QTY	DISC
_____	The Atwater Kent Story (AWA Review 12) @ \$14.95
_____	The Hallicrafters Story @ \$14.95

AWA MEMBERSHIP PIN

(QTY) _____ Pin @ \$6.00

AWA COFFEE MUG

(QTY) _____ @ \$9.75

ORDER TOTAL CALCULATION Note: Foreign postage surcharge does not apply to Canada.

_____	OTB Back Issues @ \$3.00 = \$ _____	
_____	Subtract \$ _____ Discount (if any) / Add \$3.00 foreign postage if applicable.	Total OTB Order \$ _____
_____	Total AWA Review Cost = \$ _____	
	Add \$5.00 per volume foreign postage if applicable.	Total Review Order \$ _____
_____	Individual OTB Back Issue CDs @ \$35.95 = \$ _____	
_____	Add _____ Vol 1 + Vol 2 sets @ \$59.95 = \$ _____	
	Add \$5.00 foreign postage if applicable.	Total OTB CD Order \$ _____
_____	AWA Review CDs @ \$19.95 each or \$35.00 for both = \$ _____	
	Add \$3.00 foreign postage per disk if applicable.	Total AWA Review CD Order \$ _____
_____	Atwater Kent CDs \$14.95 each = \$ _____	
	Add \$3.00 foreign postage per disk if applicable.	Total Atwater Kent CD Order \$ _____
_____	Hallicrafters CDs \$14.95 each = \$ _____	
	Add \$3.00 foreign postage per disk if applicable.	Total Atwater Kent CD Order \$ _____
_____	AWA Membership Pin @ \$6.00 = \$ _____	
	Add \$1.00 foreign postage if applicable.	Total Membership Pin Order \$ _____
_____	AWA Coffee Mug @ \$9.75 = \$ _____	
	Add \$1.00 foreign postage if applicable.	Total Coffee Mug Order \$ _____
		Grand total of individual total amounts = \$ _____

Please make your check payable to AWA Museum and send to: Edward M. Gable, 187 Lighthouse Rd., Hilton, NY 14468.

Name _____ Address _____